C55.34:C42

Draft Environmental Impact Statement

CHESAPEAKE BAY ESTUARINE SANCTUARY

PENNSYLVANIA STATE UNIVERSITY
MAY 01 1981
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Proposed Estuarine Sanctuary Grant Award for a Chesapeake Bay Estuarine Sanctuary in the State of Maryland

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Coastal Zone Management

STATE OF MARYLAND
Department of Natural Resources

PUBLIC HEARINGS WILL BE HELD

on this Draft Environmental Impact Statement for the proposed Chesapeake Bay Estuarine Sanctuary on:

May 26, 1981 at 7:30 p.m. - Rhode River Site, Anne Arundel County
Smithsonian Visitor's Center
Chesapeake Bay Center for Environmental Studies
Edgewater, Maryland

May 28, 1981 at 7:30 p.m. - Monie Bay Site, Somerset County
Somerset County Courthouse
Princess Anne, Maryland

Comments or presentations will be scheduled on a first-come, first-heard basis, and may be limited to a maximum of 5 minutes. No verbatim transcript of the hearing will be prepared, but the hearing staff will record and summarize the comments. All comments received at the hearing, or in writing, will be considered in the preparation of the Final Environmental Impact Statement.

United States

Department of Commerce

Draft Environmental Impact Statement

PROPOSED

ESTUARINE SANCTUARY GRANT AWARD

TO THE STATE OF MARYLAND

FOR

A CHESAPEAKE BAY ESTUARINE SANCTUARY

April 1981

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DESIGNATION: Draft Environmental Impact Statement

TITLE: Proposed Estuarine Sanctuary Grant Award to the State of Maryland for a Chesapeake Bay Estuarine Sanctuary

ABSTRACT: The State of Maryland has submitted an application for a grant from the Office of Coastal Zone Management to establish an estuarine sanctuary in the Chesapeake Bay, Maryland. The proposed sanctuary, when complete, will include a number of sites reflecting the broad diversity of salinity, physical systems, and biota in the Bay, for system-wide research and educational purposes. The two initial components, representing typical mid-bay eastern and western shore estuaries, are the Monie Bay system in Somerset County on the eastern shore (3,316 acres) and the Rhode River in Anne Arundel County on the western shore (2,876 acres) for a total of 6,192 acres of land and water. The land to be acquired within the Monie Bay site includes fee simple acquisition of 201 acres along the western shore of Little Creek and an easement donation of 110 acres from the Koppers Company, Inc. along the eastern shore of Little Creek. All other land at both sites is in public ownership.

Approval of this grant application would permit the establishment of an estuarine sanctuary representing a subcategory of the Virginian biogeographic region. The proposed sanctuary would be used primarily for research and educational purposes, especially to provide information useful for coastal zone management decisionmaking. Multiple use would be encouraged to the extent that it is compatible with the proposed sanctuary's research and educational programs.

Research and monitoring in and near the proposed sanctuary would provide baseline information against which the impacts of human activities elsewhere in the Chesapeake Bay and the Virginian biogeographic region could be assessed.

APPLICANT: Maryland Department of Natural Resources

LEAD AGENCY: U. S. Department of Commerce
National Oceanic and Atmospheric Administration
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Individuals receiving copies of the Draft Environmental Impact Statement will NOT automatically receive copies of the Final Environmental Impact Statement unless specifically requested, or unless they submit oral or written comments on the Draft Environmental Impact Statement.

TABLE OF CONTENTS

SECTION			PAGE
SUMMARY			i
PART I:	PURPOSE OF AND NEED FOR ACTION		1
PART II:	ALTERNATIVES (INCLUDING PROPOSED ACTION)		5
	A. Preferred Alternative		5
		1. Boundaries and Acquisition of Sanctuary Lands	
		2. Management	
		a. Management Plan	
		b. Management Structure	
		c. Sanctuary Research and Education Programs	
		d. Access to the Sanctuary	
		e. Multiple Use Policies	
	B. Alternatives Considered		15
		1. Funding	
		2. Site Selection	
		3. Boundaries	
		a. Water Boundaries	
		b. Land Boundaries	
		4. No Action	
PART III:	AFFECTED ENVIRONMENT		19
	A. Natural Environment		19
		1. Chesapeake Bay	
		2. Individual Sanctuary Sites	
		a. Geology	
		b. Hydrology and Climate	
		c. Biology	
	B. Human Environment of the Chesapeake Bay		24
		1. History	
		2. Socioeconomic Characteristics	

SECTION PAGE

3. Current Uses of the Sites

a. Commercial Shipping
b. Commercial and Sport Fishing
c. Recreational Boating

4. Water Quality

5. Land Use

PART IV: ENVIRONMENTAL CONSEQUENCES..... 35

A. Environmental Impacts of the Proposed Action 35

1. General Impacts

2. Local Impacts

3. State and Federal Impacts

B. Unavoidable Adverse Environmental or Socioeconomic Impacts..... 38

C. Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity 39

D. Irreversible or Irretrievable Commitments of Resources..... 40

E. Possible Conflicts Between the Proposed Action and the Objectives of Federal, Regional, State and Local Land Use Plans, Policies, and Controls for the Area Concerned..... 40

PART V: LIST OF PREPARERS 43

PART VI: LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS RECEIVING COPIES..... 47

PART VII: APPENDICES..... 53

SUMMARY

BACKGROUND

Section 315 of the Coastal Zone Management Act of 1972 (P.L. 92-583), as amended, established the National Estuarine Sanctuary Program, which provides grants on a matching basis to States to acquire, develop, and operate estuarine areas to be set aside as natural field laboratories. These areas are to be used primarily for long-term scientific and educational programs that will provide information essential to coastal management decisionmaking.

Uses of estuarine sanctuaries are intended to serve objectives such as the following:

-- To gain a more thorough understanding of ecological relationships within the estuarine environment;

-- To make baseline ecological measurements;

-- To serve as a natural control in order to monitor changes and assess the impacts of human stresses on the ecosystem;

-- To provide a vehicle for increasing public knowledge and awareness of the complex nature of estuarine ecosystems, their values and benefits to man and nature, and the problems confronting them; and

-- To encourage multiple use of the estuarine sanctuaries to the extent that such usage is compatible with the primary sanctuary purposes of research and education.

To ensure that the Estuarine Sanctuary Program includes sites that adequately represent regional and ecological differences, the program regulations established a biogeographical classification scheme that reflects geographic, hydrographic, and biological characteristics. Eleven (11) biogeographic categories are defined in the program regulations. Subcategories of this basic system are developed and utilized as appropriate to distinguish different subclasses of each category. The total number of sanctuaries that will be needed to provide adequate representation of the various estuarine ecosystems occurring within the United States is currently under study. The proposed sanctuary is representative of the Virginian biogeographic region.

The Estuarine Sanctuary Program regulations, first published in 1974, and amended in 1977, authorize three kinds of 50 percent matching grants: (1) an optional, initial planning grant for such preliminary purposes as surveying, appraising, and assessing the lands to be acquired, and for developing management, research, and education plans; (2) grants for acquisition of the real property within the sanctuary boundaries and construction of facilities; and (3) operational grants for managing the established sanctuary research and educational programs.

The State of Maryland is committed to maintaining the productivity of its extensive estuarine areas. This takes on national significance when one considers that most of its major estuarine area is contained in Chesapeake Bay, the Nation's largest estuary. Local residents of the Bay and citizens in other East Coast States who harvest fish such as striped bass which either spawn or grow up in Chesapeake Bay are dependent upon a productive estuary. In order to effectively manage this large ecosystem, a proper understanding of estuarine ecology is essential. For this reason, establishment of an estuarine sanctuary in Maryland would provide a valuable tool for enhancing management of Chesapeake Bay and other estuarine areas.

Maryland's activities involving the National Estuarine Sanctuary Program actually began in 1974. This included extensive evaluations of potential sites through field visits and analyses of aerial photographs. (A full description of these earlier site evaluations and selections is contained in Appendix 3.) The primary site, selected in 1975 by a steering committee composed of representatives from different State and Federal agencies, research institutions, and environmental groups, was World's End Creek located in Dorchester County. Difficulties in property acquisition were encountered with this site, however, and sanctuary activities were then discontinued.

A new effort was initiated by the Maryland Department of Natural Resources (DNR) in 1980 with the establishment of an Estuarine Sanctuary Steering Committee (SC) composed of representatives from State and Federal agencies, university and other research laboratories, citizen environmental groups, and the Coastal Resources Advisory Committee (see Appendix 2 for membership). Criteria were developed by the SC for selecting suitable sanctuary sites. Estuarine areas around the entire Maryland portion of the Bay were then ranked against each other according to those criteria.

Due to the wide range of estuarine zones in the Chesapeake Bay, the SC determined it would be best to eventually develop a series of sanctuary sites representative of each zone. The sanctuary, when complete, will include an undetermined number of sites reflecting the broad diversity of salinity, physical systems, and biota in the Bay, and will be accessible for research and educational purposes. A subcommittee of the SC, designated as the Maryland Estuarine Sanctuary Site Selection Committee (SSC), will work

with DNR to establish procedures for designating additional Maryland sites for the Chesapeake Bay Estuarine Sanctuary using the established site selection criteria. DNR and the SSC also will work with the Virginia Council on the Environment and appropriate Commonwealth agencies to develop a bi-State coordinated Chesapeake Bay sanctuary system.

Maryland's DNR, on behalf of the State, submitted a grant application to the National Oceanic and Atmospheric Administration's (NOAA) Office of Coastal Zone Management (OCZM) in September 1980 to gather information directed toward establishment of a multiple site estuarine sanctuary in the Chesapeake Bay initially consisting of two sites--Monie Bay, Somerset County, the Rhode River, Anne Arundel County, and their adjacent waters.

NOAA awarded a pre-acquisition grant of $17,500 to DNR, matched by an equivalent amount from the State, on January 23, 1981. This grant enabled DNR to proceed with development of information for a formal grant application which, if approved, would provide 50 percent matching funds for the acquisition of lands and for building educational facilities in the sanctuary. Should the proposed sanctuary be established, Maryland would also be eligible for $50,000 annual grants (also matched) for sanctuary management and operations for a period of 5 years.

PROPOSED ACTION

The grant request to NOAA for $600,000, matched by an equivalent amount by the State, would be used for fee simple acquisition of 201 acres of uplands and wetlands along the western shore of Little Creek, a tributary of Monie Bay, in Somerset County, to develop facilities to accommodate visitors and educational activities at both sanctuary sites, and to complete the selection of additional sites for the Chesapeake Bay Estuarine Sanctuary. The majority of land and all of the water included in the Monie Bay sanctuary site is in State ownership, and includes a portion of the Deal Island Wildlife Management Area. An additional 110 acres of wetlands along the eastern shore of Little Creek will become part of the sanctuary through the donation of an easement by the Koppers Company, Incorporated (see Figure 2, page 7). All of the land and water in the Rhode River sanctuary site is in public ownership. The land belongs to the Smithsonian Institution's Chesapeake Bay Center for Environmental Studies (see Figure 3, page 8). No land acquisition is intended for the Rhode River site. However, property owners are not precluded from offering donations, sale of land, or easements to the State in either the Monie Bay or Rhode River site.

The composition of real property within the proposed sanctuary is as follows:

Property	Size in Acres
Monie Bay	3,316
Existing State ownership (land and water)	3,005
Proposed Acquisition	201
Proposed Easement Donation	110
Rhode River	2,876
Existing Smithsonian ownership	2,635
Existing State ownership	241
Total Land and Water Within the Two Sites	6,192
Total Land to be Acquired	311

Maryland does not intend to exercise its power of eminent domain (condemnation) to acquire any of the land, but will rely on negotiated sales with willing sellers. The State would consider acquiring either fee simple title, conservation easements, or life estates in privately owned lands.

MANAGEMENT

The Maryland DNR, Tidewater Administration (TA), which is responsible for Maryland's coastal zone management program, will manage the proposed sanctuary. However, its management would be coordinated with the Smithsonian Institution at the Rhode River site, and the Maryland Wildlife Administration (MWA) at the Monie Bay site. The TA and its Administrator will have general oversight and responsibility for the sanctuary and its programs. To assist in this task, the TA will, at a minimum, employ a full-time Sanctuary Manager, who will have training in estuarine ecology and natural resources management, to administer both sites.

Management of the Deal Island Wildlife Management Area (DIWMA) on the Monie Bay by MWA and the Chesapeake Bay Center for Environmental Studies (CBCES) on the Rhode River by the Smithsonian Institution will continue as is. However, the TA will form agreements with MWA and the Smithsonian Institution to coordinate research and educational programs and the use of facilities on those properties that are shared in common.

The TA would also be assisted in its administration of the proposed sanctuary at both sites by one overall Estuarine Sanctuary Management Committee (ESMC), comprised of representatives of the scientific research community, the educational community, Maryland's Coastal Resources Advisory Committee, NOAA, Monie Bay and Rhode River residents, principal user groups, and conservation organizations. Federal agencies with programs that might affect the proposed sanctuary--such as the Environmental Protection Agency, the Navy, the U.S. Fish and Wildlife Service, and the Army Corps of Engineers--may also be represented on the ESMC.

RESEARCH

Chesapeake Bay and its tributaries comprise a dynamic natural system. The resiliency and productivity of the Bay combine to deter impacts of environmental degradation, however increasing human influences have placed additional stresses on this sytem. Because of the Bay's importance as both an ecological and economic resource, conflicts between economic interests and environmental concerns are inevitable. The way in which these conflicts are resolved, the compromises that are reached, and the choices that are made will determine the future of the Bay.

Both Maryland and Virginia have recognized that problems in one part of the Bay can affect the entire Bay, that the Bay is indeed one dynamic system. Therefore, laws and regulations affecting the Chesapeake should work in harmony in all parts of the Bay. Accordingly, Maryland and Virginia legislatures have established the Chesapeake Bay Commission and Bi-State Working Committee to overcome the disparity in conservation laws and regulations between the two States.

It was estimated in 1980, that at least 54 agencies were studying the Bay. Existing Bay research and management activities involve a broad spectrum of interests and jurisdictions from Federal, State, and local government agencies, to university and other research institutions, commercial interests, and the public. Unfortunately, this research often consists of piecemeal, unrelated projects with either duplication of effort or lack of shared results between agencies.

In recognition of this problem, in fiscal year 1976, Congress directed the Environmental Protection Agency (EPA) to conduct a five-year, $25 million study of the environmental quality and management of Chesapeake Bay. Through this study--known as the Chesapeake Bay Study--the EPA was directed to coordinate research to assess the principal factors impacting the Bay's water quality, and to determine which government agencies have resource management responsibilities and ways to optimize coordination among them. To further strengthen the coordination of studies of the Bay, Congress passed the Chesapeake Bay Research Coordination Act in 1980.

The proposed Chesapeake Bay Estuarine Sanctuary would provide excellent sites for coordinated estuarine research in the Chesapeake Bay. Research opportunities within the proposed sanctuary would generally fall into three categories: (1) research, analysis, and interpretation of the upland, intertidal, and benthic components of the Chesapeake Bay; (2) continuation of ongoing sampling and monitoring programs within the Bay; and (3) research on the impacts of pollutants on estuarine organisms. By establishing estuarine sanctuary sites at strategic ecological zones in the Bay for comparative research, Maryland (and Virginia eventually) will have an ability to contribute significantly to a holistic understanding of the Bay as a total system.

EDUCATION

Educational opportunities for universities, schools, and other organizations will be provided at both sites. Emphasis will be placed upon presenting the estuary as a dynamic system through field trips, lectures, and literature.

The Monie Bay site contains a variety of estuarine flora and fauna. Educational activities will be encouraged through an extensive interpretative program with guided and self-guided tours, printed materials and a boardwalk across the marsh zones. A primary user of the sanctuary will be students from the University of Maryland, Eastern Shore Campus, located only a few miles away from the site.

The Rhode River site also contains a wide diversity of habitats and, in contrast to Monie Bay, has considerable uplands on which an educational facility will be built for visiting groups. Here the education program will include lectures, seminars, and other instructional programs coordinated with the Smithsonian Institution's Chesapeake Bay Center for Environmental Studies.

RECREATION

The primary purpose of the National Estuarine Sanctuary Program is to provide long-term protection for representative, undisturbed estuarine areas, so that they may be used for scientific and educational activities. However, multiple use of sanctuaries is encouraged to the extent that such other uses are compatible with the primary sanctuary purpose. The capacity of each sanctuary to accommodate multiple uses, and the permissible kinds and levels of such uses, are determined separately for each sanctuary, and may vary considerably according to the nature of the sanctuary and its surroundings, the customary and historic uses of the sanctuary area, and such new uses as may be proposed. Low-intensity recreational activities --such as fishing, shellfishing, hunting, boating, hiking, and wildlife photography--are generally considered compatible uses of sanctuary lands and waters. From time to time, however, it may become necessary to restrict one or more such uses within a sanctuary to preserve the sanctuary's value for research or educational purposes.

DNR would monitor all activities within the proposed sanctuary. If conflicts between different sanctuary programs, and compatible uses were to arise, DNR would consult with ESMC to develop appropriate management actions. DNR has both the existing authority and the field personnel to enforce applicable regulations within the proposed sanctuary.

Areas of Controversy

Acquisition of land for an estuarine sanctuary is often a controversial issue. The local residents in the area where a sanctuary site is being proposed need to know as early as possible what an estuarine sanctuary is and what its boundaries will be.

On the eastern shore of the Bay in Somerset County, the State of Maryland has acquired over 11,000 acres of land (including marsh) which now comprise the Deal Island Wildlife Management Area (DIWMA). The area is designated for public hunting, crabbing, fishing, birdwatching, and photography. This acquisition has made the local government and citizens of Somerset County very cautious regarding any intentions the State may have to enlarge the DIWMA, thus removing more land from the tax rolls.

As soon as the Monie Bay area was selected as one of the first sites for sanctuary consideration, the Maryland Tidewater Administration requested a meeting with the Somerset County Commissioners. This meeting was held on September 2, 1980. The County Commissioners affirmed the idea of doing research in the proposed area, but insisted that the property owners would have to approve, and the University of Maryland, Eastern Shore Campus would need to be involved in the project at every stage. The money lost from the tax rolls was also a matter of concern. A public meeting was held on September 22, 1980, in Princess Anne, Maryland, 14 miles from the sanctuary site. Property owners along the Little Monie Creek were not in favor of the State acquiring any of their property; however, some went on record approving the idea of setting up research and education programs in the proposed area. The Tidewater Administration agreed to draw the boundaries at the Monie Bay site to coincide for the most part with State-owned DIWMA property and restrict acquisition to the Little Creek area where there were property owners willing to sell and where the Koppers Company, Inc. had marsh land which it was willing to donate as an easement. It was determined that the effect on tax loss would be minimal. The Somerset County government, University of Maryland, Eastern Shore Campus, and local citizens will be involved in an advisory role in the operation of the estuarine sanctuary once it is established.

On the western shore of the Bay in Anne Arundel County, the proposed sanctuary site is within the area already owned by the Smithsonian Institution, and operated as the Cheasapeake Bay Center for Environmental Studies (CBCES). The Tidewater Administration was initially willing to acquire property adjacent to CBCES for the sanctuary, but the Smithsonian Institution, which has covenants with adjacent property owners in the area, suggested that no acquisition would be necessary.

A public meeting was held by the TA at CBCES on February 26, 1981 to inform local residents about the selection of this site for consideration as part of the Chesapeake Bay National Estuarine Sanctuary. The people who attended the meeting affirmed the concept of the sanctuary, since it

blends with the current CBCES program, and one or more suggested that the sanctuary should also include property that is in the watershed for additional protection of the estuary. However, this is not a subject for consideration at this time. In the future, should property owners wish to sell or donate property or easements to the State, for inclusion in the estuarine sanctuary, these requests will be considered on a case-by-case basis.

PART I: PURPOSE OF AND NEED FOR ACTION

In response to intense pressures on the coastal resources of the United States, Congress enacted the Coastal Zone Management Act (CZMA), which was signed into law on October 27, 1972, and amended in 1976 and 1980. The CZMA authorized a Federal grant-in-aid and assistance program to be administered by the Secretary of Commerce, who in turn delegated this responsibility to the Office of Coastal Zone Management (OCZM) in the National Oceanic and Atmospheric Administration (NOAA).

The CZMA affirms a national interest in the effective protection and development of the Nation's coastal zone, and provides financial and technical assistance to coastal States (including those bordering on the Atlantic and Pacific Oceans, the Gulf of Mexico, and the Great Lakes) and U.S. territories to develop and implement State coastal zone management programs. The Act established a variety of grant-in-aid programs to such States for purposes of:

- -- developing coastal zone management programs (Sec. 305);
- -- implementing and administering coastal management programs that receive Federal approval (Sec. 306);
- -- avoiding or minimizing adverse environmental, social, and economic impacts resulting from coastal energy activities (Sec. 308);
- -- coordinating, studying, planning, and implementing interstate coastal management activities and programs (Sec. 309);
- -- conducting research, study, and training programs to provide scientific and technical support to State coastal zone management programs (Sec. 310); and
- -- acquiring land for estuarine sanctuaries and island preservation (Sec. 315).

Section 315 of the Act established the Estuarine Sanctuary Program to provide matching grants to States to acquire, develop, and operate natural estuarine areas as sanctuaries, so that scientists and students may be provided the opportunity to examine the ecological relationships within the areas over time. Section 315 provides a maximum of $3 million in Federal funds, to be matched by an equivalent amount from the State, to acquire and manage lands for each sanctuary. Regulations for implementation of the Estuarine Sanctuary Program were published on June 4, 1974 [15 CFR Part 921, Federal Register 39 (108): 19922-19927], and amended on September 9, 1977 [15 CFR Part 921, Federal Register 42 (175): 45522-45523] (see Appendix 1). Regulations are presently being prepared for the Island Preservation Program that is also included within Section 315 of the CZMA.

Estuarine sanctuaries have the dual purposes of (1) preserving relatively undisturbed areas so that a representative series of natural estuarine systems will always remain available for ecological research and education, and (2) ensuring the availability of natural areas for use as a control against which impacts of human activities in other areas can be assessed. These sanctuaries are to be used primarily for long-term scientific and educational purposes, especially to provide information useful to coastal zone management decisionmaking.

Research purposes may include:

-- Gaining a more complete understanding of the natural ecological relationships within the various estuarine environments of the United States;

-- Making baseline ecological measurements;

-- Serving as a natural control against which changes in other estuaries can be measured, and aiding in evaluation of the impacts of human activities on estuarine ecosystems; and

-- Providing a vehicle for increasing public knowledge and awareness of the complex nature of estuarine systems, their benefits to people and nature, and the problems confronting these ecosystems.

While the primary purposes of estuarine sanctuaries are scientific and educational, multiple use of estuarine sanctuaries by the general public is encouraged to the extent that such usage is compatible with the primary sanctuary purposes. Such uses may generally include low-intensity recreation, such as boating, fishing, shellfishing, hunting, and wildlife photography or observation. Commercial fishing and shellfishing may also be compatible uses.

The estuarine sanctuary regulations envision that the Estuarine Sanctuary Program will ultimately represent the full variety of regional and ecological differences among the estuaries of the United States. The regulations state that "the purpose of the estuarine sanctuary program...shall be accomplished by the establishment of a series of estuarine sanctuaries which will be designated so that at least one representative of each estuarine ecosystem will endure into the future for scientific and educational purposes" [15 CFR 921.3 (a)]. As administered by OCZM, the Estuarine Sanctuary Program defined 11 different biogeographic regions based on geographic, hydrographic, and biological characteristics. Subcategories of this basic system are established as appropriate to distinguish different subclasses of each biogeographic region. The total number of sanctuaries that will be needed to provide minimal representation for the Nation's estuarine ecosystems is currently under study.

Since 1974, OCZM has awarded grants to establish nine estuarine sanctuaries. These include:

Sanctuary	Biogeographic Classification
South Slough Coos Bay, Oregon	Columbian
Duplin River Sapelo Island, Georgia	Carolinian
Waimanu Valley Island of Hawaii, Hawaii	Insular
Rookery Bay Collier County, Florida	West Indian
Old Woman Creek Erie County, Ohio	Great Lakes
Apalachicola River/Bay Franklin County, Florida	Louisianian
Elkhorn Slough Monterey County, California	Californian
Padilla Bay Skagit County, Washington	Columbian
Narragansett Bay Newport County, Rhode Island	Virginian

The proposed action under consideration by OCZM is a land acquisition grant application from the State of Maryland to establish a National Estuarine Sanctuary in Chesapeake Bay. This sanctuary eventually will consist of a number of individual sites, representing different zones within the Bay, and will contain approximately 6,192 acres of land, marshes, and waters at the two initial sites. This acquisition application requests funds from NOAA to be matched by an equivalent amount of State funds for the purchase of about 201 acres of land along the western shore of Little Creek that flows into Monie Bay in Somerset County, to develop facilities to accommodate visitors and educational activities at the sanctuary sites at Monie Bay and Rhode River, and to complete the selection of additional sites for the Chesapeake Bay Estuarine Sanctuary.

The Chesapeake Bay Estuarine Sanctuary, if established, would represent a major subcategory within the southern half of the Virginian biogeographic region. This region extends over 1,000 miles of Atlantic coastline from Cape Cod to Cape Hatteras, featuring lowland streams, marshes, and muddy bottoms with primarily temperate biota and some boreal representatives.

Maryland's proposal follows several years of interest in and concern for the estuaries in the Chesapeake Bay by State and local officials, and university and conservation groups. The two initial components to be included in the estuarine sanctuary--Monie Bay, Somerset County, and the Rhode River, Anne Arundel County--were selected by a Maryland Estuarine Sanctuary Steering Committee because they are essentially undisturbed, representative estuarine sites, and because publicly owned land and water comprising an estuarine system was available for research, education, and recreation purposes. On January 23, 1981, NOAA awarded Maryland a $17,500 pre-acquisition grant for the proposed sanctuary, which enabled the State to initiate a real estate appraisal and environmental assessment of the sites, and to prepare management, research, education, and recreation plans.

PART II: ALTERNATIVES (INCLUDING PROPOSED ACTION)

A. Preferred Alternative

The State of Maryland intends to submit an application for Federal acquisition grant funding of $600,000 to be matched by an equivalent amount of State funding to acquire lands, establish facilities necessary for an estuarine sanctuary in Chesapeake Bay, and to complete the selection of additional sites for the Chesapeake Bay Estuarine Sanctuary. This sanctuary will encompass a system of different sites initially composed of Monie Bay in Somerset County and the upper reaches of Rhode River in Anne Arundel County (Figure 1). The proposed site at Monie Bay would include 2,550 acres of land and 767 acres of water and would be managed by the Maryland Department of Natural Resources (DNR). The site in Rhode River has a land area of 2,685 acres and 191 acres of open water and will be managed primarily by the Smithsonian Institution in cooperation with DNR.

1. Boundaries and Acquisition of Sanctuary Lands

The boundaries of an estuarine sanctuary "may include any part or all of an estuary, adjoining transitional areas, and adjacent uplands, constituting to the extent feasible a natural unit" (15 CFR 921.2). The proposed sanctuary lies within Chesapeake Bay, the Nation's largest estuary; it has a surface area of about 4,412 square miles and drains a watershed of over 64,000 square miles. Because of Chesapeake Bay's enormous size, it is necessary to select several sites comprising representative subsystems, which will better reflect the environmental gradients and diversity within the Bay. Both Monie Bay and Rhode River contain tributary streams, open waters, and adjacent uplands within their proposed boundaries (Figures 2 and 3, respectively) and therefore comprise natural units.

The majority of land and all of the water included in the Monie Bay sanctuary site is in State ownership, and is managed by the Wildlife Administration, DNR, as the Deal Island Wildlife Management Area. An additional 110 acres of wetlands along the eastern shore of Little Creek will become part of the sanctuary through the donation of an easement by the Koppers Company, Incorporated. The proposed acquisition of private property is on the west bank of Little Creek in the Monie Bay site. All of the land and water in the Rhode River sanctuary site is in public ownership. The water and most of the wetland area are State-owned and the land above high water mark within the Sanctuary belongs to the Smithsonian Institution's Chesapeake Bay Center for Environmental Studies. No land acquisition is intended for the Rhode River site. However, property owners are not precluded from offering donations, sale of land, or easements in either the Rhode River or Monie Bay sites to the State of Maryland.

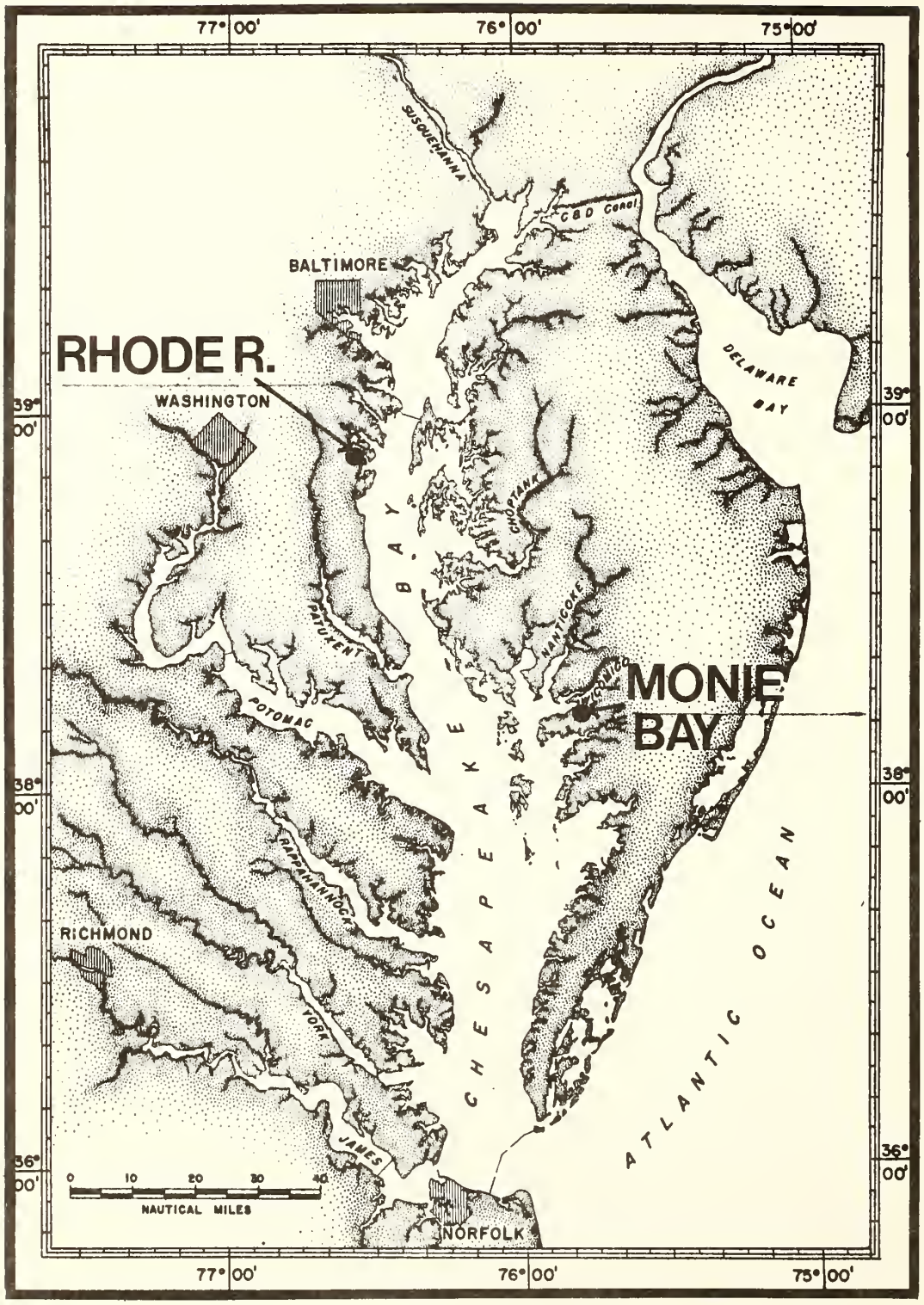
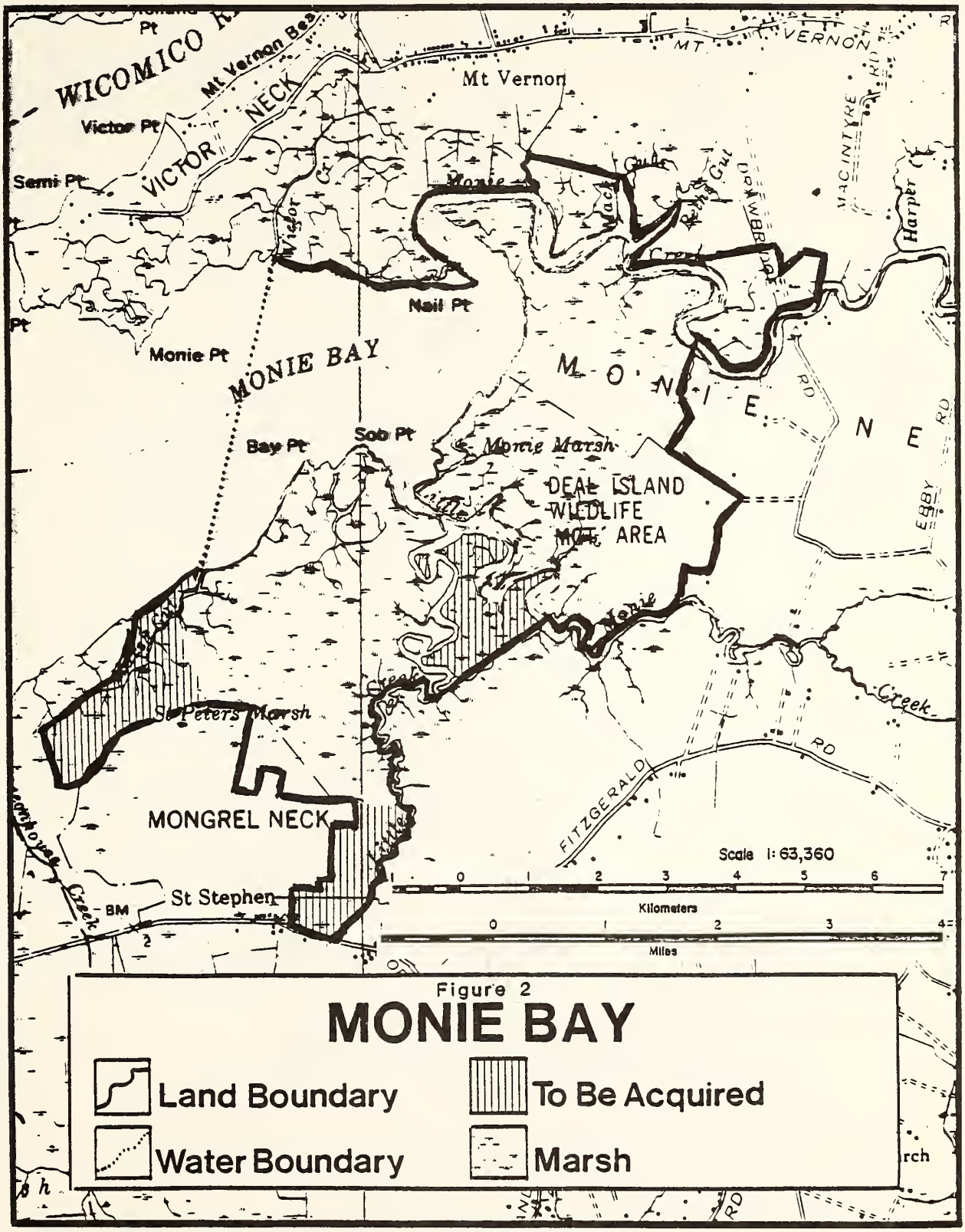


Figure 1

Chesapeake Bay


WICOMICO R
Mt Vernon Bay
Victor Pt
VICTOR NECK
Semi Pt
Mt Vernon
MT VERNON RD
MACINTYRE RD
Harper Cr
Monie
Nail Pt
Monie Pt
MONIE BAY
MONIE NE
RD
Bay Pt
Sob Pt
Monie Marsh
DEAL ISLAND
WILDLIFE
MGT AREA
Creek
St Peters Marsh
MONGREL NECK
FITZGERALD RD
Scale 1:63,360
Kilometers
Miles
St Stephen
BM
Figure 2
MONIE BAY
Land Boundary
To Be Acquired
Water Boundary
Marsh

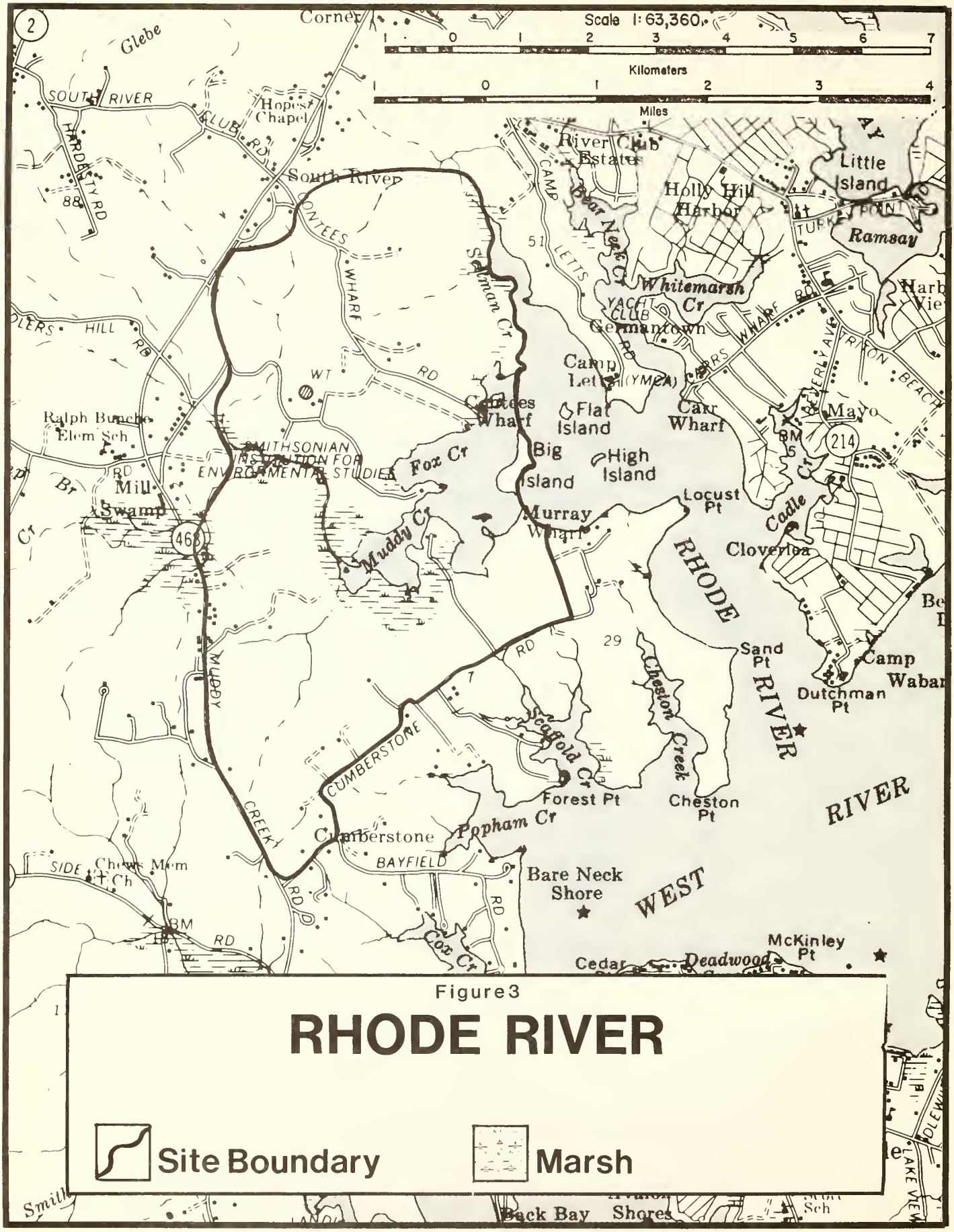


Figure3

RHODE RIVER

The grant request to NOAA for acquisition funding, matched by State resources, would be used for the fee simple acquisition of 201 acres of privately-owned wetlands and uplands at the Monie Bay site and for developing visitor access and educational facilities at the two sites. This will include a building for estuarine education near Fox Point at the Rhode River site and improving existing visitor facilities belonging to the Maryland Wildlife Administration at the Deal Island Wildlife Management Area, which contains most of the Monie Bay site.

The composition of real property within the proposed sanctuary is as follows:

Property	Size in Acres
Monie Bay	3,316
Existing State ownership (land and water)	3,005
Proposed acquisition	201
Proposed easement donation	110
Rhode River	2,876
Existing Smithsonian ownership	2,635
Existing State ownership (water only)	241
Total Land and Water Within the Two Sites	6,192
Total Land to be Acquired	311

Land acquisition would be performed in accordance with Federal laws and regulations for real estate acquisition, including an independent appraisal and the offer of Fair Market Value. Maryland does not intend to exercise its power of eminent domain (condemnation) to acquire any of the land, but will rely on negotiated sales with willing sellers. The State would consider acquiring either fee simple title, conservation easements, or life estates in privately-owned lands.

2. Management

a. Management Plan

The specific management policies developed for the estuarine sanctuary uplands and wetlands will be based on the primary objective of managing the lands to maintain their ecosystem, in order to ensure the long-term protection of natural processes and resources for research and education. Fishing, hunting, non-intensive recreation, education, and research would be allowed as prescribed under conditions established pursuant to existing State laws, and a management concept approved by the Estuarine Sanctuary Management Committee (ESMC--discussed later).

The State and Smithsonian-owned lands were acquired for a number of different purposes, including recreation, wildlife management, research, conservation, and protection of environmentally unique and irreplaceable lands. Although management of these lands differs according to the objective of acquisition, the present management objectives are compatible with the objectives of managing the sanctuary for its long-term use for research and education within an estuarine system. Therefore, inclusion of these lands within the sanctuary boundaries will not affect the present management practices, and the existing State and Smithsonian-owned parcels will continue to be managed according to existing management concepts and plans. Ownership and management decision authority will be retained by the agencies now exercising those responsibilities. Changes in management plans and development projects on these lands will be reviewed by the ESMC which may provide advisory comments on the plans and activities, but will have no regulatory authority over these lands.

An Estuarine Sanctuary Management Plan (ESMP) for the Chesapeake Bay National Estuarine Sanctuary will be formulated within one year after the acquisition grant is awarded. This plan will provide a framework for conducting research and educational programs and integrating sound public uses into the broader national estuarine sanctuary purposes.

b. Management Structure

The Maryland DNR, Tidewater Administration, which is responsible for Maryland's coastal zone management program, will manage the proposed sanctuary in accordance with the ESMP. However, its management would be coordinated with the Smithsonian Institution at the Rhode River site, and the MWA at the Monie Bay site. Specifically, TA and its Administrator will have general oversight and responsibility for the sanctuary and its programs. To assist in this task, TA will, at a minimum, employ a full-time Sanctuary Manager, who will have training in estuarine ecology and natural resources management, to administer all of the sites. The duties of the manager will include:

o Administration of the Sanctuary, including preparing required State and Federal grant applications, proposals, budget, and reports, and maintaining necessary records.

o Working with members of the ESMC and Site Selection Committee.

o Representing the ESMC in public meetings.

o Advising and coordinating with universities and units of government, both within DNR and other agencies, on particular issues, questions, and projects that impact on the sanctuary, at their request.

o Seeking and coordinating special studies and research activities within or related to the sanctuary, and interpreting and applying research results to produce benefits to the Maryland coastal management program.

o Developing and giving general oversight to an educational program for the sanctuary.

o Coordinating research efforts with the University of Maryland Sea Grant Program, Chesapeake Research Consortium, State of Virginia government and university programs, and other Chesapeake Bay research programs.

Other personnel may be employed and trained within the appropriate divisions of DNR to assist in the administration of the sanctuary, including conducting interpretive tours and other visitor activities.

TA also would be assisted in its administration of the proposed sanctuary at both sites by one overall ESMC comprised of representatives of the scientific research community, the educational community, Smithsonian Institution, Maryland Wildlife Administration, NOAA, Monie Bay and Rhode River residents, principal user groups, and conservation organizations. Federal agencies with programs that might affect the proposed sanctuary--such as the Environmental Protection Agency, the Navy, the U.S. Fish and Wildlife Service, and the Army Corps of Engineers--may also be represented on the ESMC. ESMC functions would include:

o Advising DNR and the Sanctuary Manager on sanctuary administration. In this role, ESMC would assist DNR in developing guidelines for sanctuary management, as well as job specifications for the Sanctuary Manager.

o Evaluating what types of research will best address Chesapeake Bay management issues and preparing a list of needed, complementary studies.

o Reviewing proposals for research and educational activities within sanctuary lands or waters, and making appropriate recommendations to DNR.

o Resolving conflicts between different sanctuary users.

o Reviewing and advising DNR on its proposed sanctuary management grant budgets.

To assist DNR in expanding the sanctuary system to include additional sites representing different ecological zones, a Site Selection Committee (SSC) will be formed. The SSC will be comprised of members representing the State Coastal Zone Management Program, Chesapeake Research Consortium, Coastal Resources Advisory Committee, and other public and private environmental and educational organizations.

DNR, working with the SSC, will establish procedures for designating additional Maryland sites for the Chesapeake Bay Estuarine Sanctuary using the established site selection criteria described in Maryland's Estuarine Sancturay Site Selection Process (Appendix 3). These sites will be

distributed throughout the Maryland portion of the Chesapeake Bay and will be selected to represent the different salinity zones and biological distributions found there. This will allow research conducted at the different sites to be more accurately extrapolated to the variety of conditions found in the Bay. It is expected that a minimum of four additional sites eventually will be selected.

DNR and the SSC will also work with the Virginia Council on the Environment and appropriate Commonwealth agencies in their efforts to establish a Chesapeake Bay Estuarine Sanctuary in Virginia. These efforts would include developing a bi-state coordinated Chesapeake Bay Sanctuary system, research information exchanges, and coordination with the Chesapeake Bay Commission, Bi-State Working Committee, and the Federal Office of Chesapeake Bay Research Coordination.

Maryland estuarine sanctuary pre-acquisition activities have been guided by the Estuarine Sanctuary Steering Committee. This Committee is composed of representatives from State and Federal agencies, university and other research laboratories, citizen environmental groups, and the Coastal Resources Advisory Committee (see Appendix 2 for membership). This Committee recommended that it continue to exist as a forum to discuss sanctuary issues after the sanctuary is established.

c. Sanctuary Research and Education Plans

Research

The two initial Chesapeake Bay Sanctuary sites offer excellent opportunities for a variety of estuarine research. Results of studies here can be applied to similar Bay tributary systems, increasing our understanding of how coastal management activities can be improved. Due to the distinct geographical differences between the Bay's eastern and western shores, the two sites, Monie Bay on the eastern shore and Rhode River on the western shore, will yield unique information relevant to their adjacent areas. In general, western shore tributaries run through more hilly terrain with narrow marsh zones. In contrast, middle and lower eastern shore tributaries drain low flat areas and have broad marshes. The two sites represent these general features very well.

Some of the desirable characteristics of these sites for research include:

- o High marsh and low marsh zones with a variety of plant species.
- o Presence of nearly complete tributary systems, allowing studies of processes along a salinity gradient from the estuary up to freshwater inflows.
- o Relatively undisturbed adjacent lands, allowing more natural baseline measurements.

- Tidal creeks and rivulets are present for studies of their use by juvenile fish as nursery areas.

- Little Creek at the Monie Bay site is bordered by marshes and forests and can be compared with a similar tributary outside the sanctuary bordered by agricultural land, less than a mile away.

- Both sites are close to educational and research institutions. Monie Bay is 10 miles away from the University of Maryland - Eastern Shore, headquarters of the University Marine and Estuarine Environmental Studies Program. University of Maryland Horn Point Environmental Laboratory is less than 1 1/2 hours away. The site on Rhode River is 1 mile away from the Smithsonian Institution Chesapeake Bay Center for Environmental Studies. The University of Maryland's Chesapeake Biological laboratory is less than 1 hour away from Rhode River and the Johns Hopkins University Chesapeake Bay Institute is less than a half hour away.

- An endangered species, the bald eagle, utilizes habitat in both sites.

The vast opportunities for research in the proposed sanctuary will be considered by ESMC and DNR and priorities will be developed to determine which studies will most benefit management efforts. Members of the Chesapeake Bay research community will be brought together by DNR to assist in developing a coordinated research plan. The detailed research plan along with study priorities will be available from DNR Coastal Resources Division.

Education

Educational opportunities for universities, schools, and other organizations will be provided at both sites. Emphasis will be placed upon presenting the estuary as a dynamic system through field trips, lectures, and literature. Interpretive trails, with guided tours and a boardwalk across marsh zones, will be developed to let visitors observe differences in marsh vegetation and common estuarine organisms.

Although educational facilities for visitors will be developed at both sites, the program at Rhode River will be more heavily utilized due to its location within 35 miles of both Washington and Baltimore. For this reason, an estuarine education building is planned for Fox Point on Rhode River. Lectures and other instructional programs will be conducted for visiting groups at this facility, coordinated by the Smithsonian Institution Chesapeake Bay Center for Environmental Studies. Final plans for educational activities would be reviewed by ESMC and will be available from DNR Coastal Resources Division.

d. Access to the Sanctuary

Both sites are already accessible to private boats. Boat access will be improved at Monie Bay with a planned launching ramp off Drawbridge Road on Monie Creek. This portion of Drawbridge Road will also be upgraded and a parking lot improved. Additional visitor access and an interpretive boardwalk across marsh zones is planned for an area off Drawbridge Road south of Monie Creek. Research sites in Little Creek would be reached by boats launched at Monie Creek.

Researchers working in Rhode River will have access to the estuary through the Smithsonian Institution entrance off Contees Wharf Road. However, this road is not suitable for general visitor and educational group traffic. Visitors will have access to a separate parking facility to be developed with access off Muddy Creek Road. Travel from this parking facility to the estuary and to the future visitor center at Fox Point will be limited so as not to have adverse impacts on residents, whose property adjoins the sanctuary.

e. Multiple Use Policies

Within the context of existing State statutes and regulations, the following specific policies apply to compatible uses within the sanctuary, all of which are subservient to the primary use, which is estuarine research and education. In both sites, changes in management policies and regulations that affect the sanctuary will be reviewed by the ESMC, which will provide advisory comments on recommendations to Maryland DNR and the Smithsonian Institution. The policies on multiple use will be recorded in the final ESMP.

Monie Bay

Current DIWMA public activities, including recreational boating, commercial and sport fishing, hunting, and trapping, will continue. Hunting and trapping at the Monie Bay site will continue to be managed by MWA. Duck hunting seasons occur October 26-27, November 9-23, and December 11-January 12 (open dates vary). Canadian Goose hunting seasons occur October 26-November 23 and December 3-January 31 (open dates vary). Educational activities during the hunting season could conflict with hunters and trappers and extra care will have to be taken to provide for visitor safety.

New activities that will be introduced as part of the sanctuary program will include marsh walks, interpretive and self-guided tours, and research projects.

Rhode River

Current CBCES public activities are confined to nature trails and interpretive tours. Hunting and trapping are not allowed on CBCES property by the Smithsonian Institution. This policy will continue. However, recreational boating, and commercial and sport fishing within the State-owned waters of the sanctuary will continue to be allowed subject to existing State laws.

B. Alternatives Considered

1. Funding

Due to the fact that most of the property within the proposed Chesapeake Bay Estuarine Sanctuary boundaries is already publicly owned, only limited funds would be needed for acquisition at Monie Bay and visitor facilities at both sides. Most of the existing State-owned lands at this site were purchased with Federal Pittman-Robertson Funds and Maryland Program Open Space Funds.

Estuarine Sanctuary Program funds were selected for three reasons:

-- Program Open Space Funds were very limited and committed to other State land programs.

-- The National Estuarine Sanctuary Program includes five years of management funds, which would be useful to the proper management of the proposed sanctuary in the first years after its establishment.

-- The National Estuarine Sanctuary Program would attract national attention to the area and thus enhance research, education, and ecosystem management programs in the Bay.

2. Site Selection

Locating a National Estuarine Sanctuary in Maryland is not only of importance because it establishes a sanctuary which is representative of the southern portion of the Virginian biogeographic region, but more importantly it establishes an estuarine sanctuary within Chesapeake Bay, the nation's largest and most productive estuary.

Numerous sites were evaluated by DNR staff and the Estuarine Sanctuary Steering Committee during the interval from 1974 to 1980. Originally World's End Creek in Dorchester County was selected as the primary site for sanctuary designation. However, acquisition problems forced this site to be dropped both in 1975 and 1980.

The major options for a Chesapeake Bay Estuarine Sanctuary included choosing one site within the Bay to represent the entire Bay, or choosing several or more sites that would represent various aspects of the physical systems and biota within the Bay. The Estuarine Sanctuary Steering Committee felt that only a multiple-site sanctuary would adequately represent the length and breadth of the Bay's physical and biological diversity. These sites would collectively characterize Chesapeake Bay ecology and be identified as the Chesapeake Bay Estuarine Sanctuary at a particular location. Establishment of a multiple site sanctuary in the Bay would allow the State of Virginia to add its own sanctuary sites to the Bay system at a later date.

The choice of representative sites was exceedingly difficult; providing an incalculable number of alternatives. Rather stringent criteria for selection were developed by a steering committee representing Federal and State agencies, Maryland research institutions, environmental organizations, and knowledgeable citizens.

The initial two sites selected by the Steering Committee for nomination to OCZM were Monie Bay and Rhode River. These two sites were selected due to the distinct geographical differences between the Bay's eastern and western shores and the fact that these sites represented larger adjacent areas. In general, western shore tributaries run through more hilly terrain with narrow marsh zones. In contrast, middle and lower eastern shore tributaries drain low flat areas and have broad marshes. These two sites are characteristic of these features and also other attributes important to estuarine ecology (see Section 2.C., Sanctuary Research and Education Plans, page 12). A full discussion of the site selection process is contained in Appendix 3.

The final selection of Monie Bay in Somerset County and Rhode River in Anne Arundel County out of a list of eight sites that met all of the criteria was made initially on a scientific basis. However, these two sites also have the advantage of including a large amount of publicly owned land, thus reducing the amount of time and money required for acquisition. Some of the other suitable sites were set aside for future consideration under a potential Chesapeake Bay Sanctuary system. A site selection committee will continue to examine the sites that potentially meet all of the criteria and recommend specific areas for inclusion in the sanctuary as one of the conditions of this grant.

The sites were evaluated by the Committee according to the criteria listed below:

1) Presence of a complete system--estuary, wetlands, and uplands.

   a) Presence of a tributary on the site. Is tributary entirely within site boundaries?

   b) Wetland area comprises a significant percentage of the site area.

c) Presence of a salinity gradient along the estuarine portion of the site.

2) Relative lack of disturbance on the site and/or compatible land/water use within the watershed.

3) Suitability of the site for educational and estuarine research activities.

4) Representative of larger portions of Maryland's Chesapeake Bay estuarine system.

5) Presence of endangered species within site.

6) Proximity of site to other State or Federal protected natural areas.

7) Diversity of habitats within site boundaries.

8) Acquisition cost and impact on property owners.

3. Boundaries

a. Water Boundaries

The proposed sites include tributaries to Chesapeake Bay and some open estuarine waters. Proposed acquisition at the Monie Bay site would include 201 acres of private property bordering nearly the entire length of the western shore of Little Creek. The open water boundary for Monie Bay is a line running north from the mouth of Marsh Gut to the mouth of Victor Creek. Originally the upstream boundaries of this site were planned to include the Little Monie Creek tributary, but objections from some of the local residents caused this area to be excluded.

Water boundaries for the Rhode River site include most of the Muddy Creek tributary up to Muddy Creek Road. The downstream boundary for this site lies along a line from Sheephead Cove to Big Island and from Big Island to the shore just upriver from Murray Wharf. This open water boundary was not extended further downriver to avoid including waters from Sellman Creek which are more impacted by development.

b. Land Boundaries

Monie Bay

In the original plan, land boundaries for the Monie Bay site were to include a portion of the Deal Island Wildlife Management Area, and the borders of the Little Monie Creek and Little Creek along most of their length, pending County and property owner approval. However, objections

by local property owners along the upper portion of Little Monie Creek caused the eastern boundary along that system to end where Little Creek branches off from Little Monie Creek. Boundaries along Little Creek will be controlled by the acquisition of 201 acres of property from willing sellers, and by an easement donation of 110 acres from the Koppers Company, Incorporated. This boundary could be expanded at a later time if other property is made available to DNR. The southern and northern boundary lines are the result of negotiations between the Tidewater Administration and the Wildlife Management Administration which manages DIWMA. Theoretically the sanctuary could encompass all of the DIWMA; however, mosquito ditching and habitat manipulation excluded some parts of the DIWMA from the sanctuary.

Rhode River

Several alternative land boundaries for the Rhode River site were considered. One alternative was to make the sanctuary boundary contiguous with the entire Smithsonian Institution property boundary. This alternative was rejected because the total sanctuary then would include parts of watersheds draining into tributaries other than Rhode River, some of which have more development. It was therefore decided to exclude Smithsonian holdings south of Cumberstone Road and some of the properties north of Contees Wharf Road. Another boundary alternative was to acquire private property that is in the watershed, but outside the CBCES, providing there were willing sellers. The Smithsonian Institution already has some land use restriction agreements with adjacent land owners, and discouraged DNR from trying to acquire any private property at this site, in order to maintain good relations with its neighbors. The preferred alternative was to keep the sanctuary boundaries within CBCES and within the watershed.

4. No Action

Under this alternative, lands at Monie Bay and Rhode River would still receive protection as part of the Deal Island Wildlife Management Area and Chesapeake Bay Center for Environmental Studies, respectively. However, lands proposed for sanctuary acquisition along Little Creek at Monie Bay would not be acquired. Estuarine research by the Smithsonian Institution would still continue on Rhode River; however, public education programs would not be developed for this site. Research and education programs planned for Monie Bay could not be conducted. Without sanctuary designation and funding, a valuable system for coordinating estuarine research in Chesapeake Bay would not be implemented. Benefits derived from increasing the public's understanding of the value of estuaries would also be lost.

Without an estuarine sanctuary in the Chesapeake Bay, as this proposal recommends, there would be no estuarine sanctuary to represent a major subcategory of the Virginian biogeographic region, thus closing off the benefits derived from research and education programs in ecological zones representative of the Nation's largest estuary.

PART III: AFFECTED ENVIRONMENT

A. Natural Environment

1. Chesapeake Bay

The Chesapeake Bay is the largest estuary in the United States and one of the largest in the world (U.S. Dept. of the Army, 1977). It is 190 miles long and drains a watershed of about 64,000 square miles through more than 150 rivers and tributaries (EPA, 1980). The Chesapeake Bay traverses two states with the southernmost portion (Virginia) extending 59 miles from the Atlantic Ocean upstream to the Virginia-Maryland State line and the Maryland portion (often referred to as Upper Chesapeake Bay) extending another 109 miles upstream to the Susquenhanna River (R. Lippson and A. Lippson, 1979). Chesapeake Bay is a highly dendritic, coastal plain estuary and including tributaries has over 8,000 miles of shoreline (EPA, 1980). The Chesapeake Bay is generally considered to be a relatively unpolluted estuary. The general consensus is that it is in good condition compared to other east coast estuaries (such as Raritan Bay, Delaware Bay, and the Hudson River) (Cronin, 1977). However, serious problems do exist within many of its tributaries. There is growing concern about changes occurring in the bay ecosystem.

Fisheries resources of Chesapeake Bay are extensive and valuable. Oyster, Crassostrea virginica, and blue crab, Callinectes sapidus, production rank among the highest in the United States. The soft clam, Mya arenaria, industry, non-existent before 1951, now competes favorably with New England's harvest since the invention of the hydraulic clam dredge (R. Lippson and A. Lippson, 1979).

Chesapeake Bay serves as the spawning and nursery area for a large portion of the Atlantic Coast striped bass, Morone saxatalis, stock (Koo, 1967), as well as a nursery area for many other commercially important marine fishes such as menhaden, Brevoortia tyrannus, bluefish, Pomatomus saltatrix, and the drum family, Sciaenidae. It is estimated that 90 percent of the striped bass found from North Carolina to Maine are spawned in the Chesapeake (EPA, 1980). The Chesapeake Bay is also a summer feeding ground for many marine fishes that may move upstream as far as Baltimore to prey on the abundant estuarine forage species such as the anchovy, Anchoa mitchelli, and silversides, Menidia spp. (Lippson and Lippson, 1979).

Chesapeake Bay forms part of the Atlantic flyway and is a major overwintering site for migratory waterfowl. The annual waterfowl census taken jointly by the U.S. Fish and Wildlife Service and the State of Maryland in 1977 estimated over 600,000 Canada geese and 40,000 whistling swans in the Chesapeake Bay area. It is a nesting area for the endangered bald eagle and the threatened osprey whose largest population in the United States is found in the Bay region (EPA, 1980).

The affected environment for the two initial Chesapeake Bay Estuarine Sanctuary sites, Rhode River (Anne Arundel County) and Monie Bay (Somerset Coun ty), representing typical mid-bay western and eastern shore estuaries, will be discussed in this section.

2. Individual Sanctuary Sites

a. Geology

Rhode River (Anne Arundel County)

Site Geology - The proposed Rhode River estuarine sanctuary site lies in surface deposits of Pleistocene and Eocene Age (Glaser, 1976). These are part of a sequence of interbedded sands, gravels, silts and clays of the Atlantic Coastal Plan on the western shore of the Chesapeake Bay.

Regional Geological Setting - A recent comprehensive study of the geology and mineral resources of southern Maryland by Glaser (1971) described the Pleistocene deposits of the Talbot Formation as interbedded sands, silts, and clays containing a fossil assemblage suggesting deposition during interglacial conditions.

The Eocene deposits of the Nanjemoy Formation contain fine-to-medium grained sand with interbedded lenses of dark gray silty clay. This formation also contains traces of glauconite. The environment of deposition for this formation is interpreted as relatively shallow water.

Where these formations are exposed along the shoreline of the Chesapeake Bay in the vicinity of the proposed Rhode River estuarine sanctuary site, they form low-lying banks with beaches composed of medium- to fine-grained sand which steadily decreases in size to silts and clays offshore (Zabawa, et. al., 1981).

Monie Bay (Somerset County)

Site Geology - The proposed Monie Bay estuarine sanctuary site lies in surface deposits of Quaternary Age (Cleaves, et. al., 1968) which are composed of grey to buff sands with interbedded clays and shell beds. These are part of a sequence of intercalated fluvial sands and marsh beds on the western side of the Delmarva Peninsula.

Regional Geological Setting - A recent comprehensive study of the geology of the Delmarva Peninsula by Owens and Denny (1979) described the western side of the Delmarva Peninsula as broad (up to 30 miles wide) lowland in which surface altitudes are from 0 to 25 feet above sea level. Most altitudes however are less than 10 feet. A prominent west-facing scarp separates the coastal lowland in which Monie Bay is situated from the higher terrain of the central Delmarva Peninsula.

This lowland is extensively dissected, and contains bay flats and broad valley bottoms. Narrow estuaries such as Monie Bay are bordered by tidal marshes of Holocene Age, which extend east from Chesapeake Bay and Tangier Sound across this coastal lowland into the Central Delmarva Peninsula (Mathews and Hall 1966). At Monie Bay, the Holocene Marsh Deposits overlap the Lowland Quaternary Deposits described above. Many names have been given to these lowland deposits which underlie the marsh sediments; for example: Talbot, Pamlico, and Princess Anne Formations. But Owens and Denny (1979) have concluded that the lowland deposits in the area do not form wave-built marine terraces of the sort described in these formations by many earlier workers, and they have proposed renaming these deposits as the Kent Island Formation.

The type section of the proposed Kent Island Formation is located along bluffs on the Chester River, nearly 40 miles to the north. This section contains thick beds of loose, light-colored cross-stratified sand that overlies dark-colored massive-to-thinly-laminated silt. Gravels as much as 4 inches in diameter occur in beds or as scattered clasts in both the sand and clay-silt.

The Kent Island Formation is variable in lithology and thickness, and in many areas the proposed Kent Island Formation is difficult to distinguish from underlying older Quaternary beds. In the area of Monie Bay, the underlying beds below the Kent Island sediments are part of the lower Chesapeake Group (Calvery and Choptank Formations) and the Beaverdam Sand. Some of these deeper formations are important aquifers of the Delmarva Peninsula whose characteristics have been the subject of many earlier studies (Cushing, et al., 1973; Rasmussen and Slaughter, 1955; Mack, et al., 1971; Rasmussen and Andreasen, 1959; Boggess and Heidel, 1968; Hansen, 1966).

b. Hydrology and Climate

Rhode River

The Rhode River is a small embayment of the northwestern shore of the Chesapeake Bay in Anne Arundel County, Maryland. It consists of a watershed of approximately 18 miles (46.5 km) which is drained by several creeks. Depths vary from 13 feet (3.96 m) at the mouth of the River to 7 feet (2.13 m) at the confluence of Muddy Creek and Sellman Creek.

Salinity varies inversely with streamflow in the Rhode River. The effects on salinity from the smaller freshwater creeks are slight. The exchange of Chesapeake Bay water is the dominant factor controlling salinity in the river, and average weekly salinity varies from 3.5 to 13.0 parts per thousand. Water temperatures range from .7°C to 32.6°C with daily changes seldom exceeding 2°C.

The tides are semi-diurnal and have a mean range of 1.50 feet (.46 m). Mean low water is 5.46 feet (1.66 m) and high water is 6.96 feet (2.12 m). The water levels are generally lower from December through March due to north and northwest winds that increase the rate of egress from the Chesapeake Bay. Water levels are higher from March through November due to southerly winds that reverse this process.

The Rhode River's climate is of continental type with well-defined seasons. The Chesapeake Bay exerts a considerable modifying effect on the climate of this area. The warmest part of the year is the last half of July, when the maximum afternoon temperatures average about 89°F. The coldest period of the year is the last of January, when morning temperatures average about 24°F.

The average annual precipitation is 40-44 inches, with the greatest monthly precipitation occurring in August. Most precipitation in the colder half of the year is a result of low pressure systems moving northeastward along the coast. In the summer, precipitation occurs in the form of showers and thunderstorms.

Monie Bay

The Monie Bay area consists of a small embayment and tributary system on the southeastern shore of the Maryland Chesapeake Bay area. Monie Bay is a tributary to Tangier Sound. The Little Creek watershed which drains into Monie Bay is about 5 square miles (12.95 sq km) in area. Monie Bay has a surface area of about 1.2 square miles (3.0 sq km). The depth of Monie Bay at the mouth of Little Creek is about 2 feet (0.61 m) and near Tangier Sound is about 6 feet (1.83 m).

Salinities range from 12 parts per thousand (ppt) in the spring to about 17 ppt in the autumn, and water temperatures vary from 0.7°C to 33°C.

The tides are semi-diurnal and have a mean range of 1.0 feet (0.305 m). The water levels are generally lower in the winter due to north and northwest winds that increase the egress from the Chesapeake Bay, while water levels are higher in the spring and summer due to southerly winds that reverse the process.

The Monie Bay area's climate is humid and semicontinental with mild winters and hot summers. Mean air temperatures range between a July high of 88°F and a February low of 28°F. In winter, the Appalachian Mountains and the waters of the Bay have a moderating effect on the cold northwest air.

Rainfall in the area is more variable and less dependable in summer than in the winter. The average annual total rainfall is 46.4 inches with 3.4 inches occurring in February and 5.4 inches occurring on the average in August. Droughts can occur in the summer, although rainfall is generally adequate.

c. Biology

Rhode River

The Rhode River site contains a wide variety of aquatic and terrestrial habitats. The open water and tidal marsh areas are bordered by upland slopes with an open canopy forest. Slopes of forested areas vary widely and average between 3 and 9 percent (Correll, 1977). Forests are dominated by river birch, red maple, American elms, and sycamores in the overstory.

Tidal marshes at this site are located along the Muddy Creek tributary. Marsh areas form a narrow border between the upland forest and open water along the upper reaches of Muddy Creek and then become much broader as the creek enters Rhode River. Low marshes are dominated by cattails, Typha angustifolia, or by big cordgrass, Spartina cynosuroides. High marshes are more complex with patches of marsh elder, Iva frutescens, salt grass, Distichlis spicata, and saltmeadow cordgrass, Spartina patens associations, patches of three square grass, Scirpus olneyi, and patches of saltmeadow cordgrass, Spartina patens. Some high marsh areas are also dominated by rosemallow, Hibiscus salustris (Correll, undated).

Fish species occurring in Rhode River include carp, bluegill, mummichog, yellow perch, spot, and menhaden. Common invertebrates include grass shrimp, amphipods, and mud crabs, (Correll, undated). A more complete listing of species occurring in the sanctuary site vicinity is contained in Appendix 4.A.

Numerous bird species occur within the Rhode River site. These include both migratory and year-round resident species. Examples of water-fowl species are black duck, mallard, great blue heron, whistling swan, and Canada goose. Upland species include bald eagle, pileated woodpecker, blue bird, and cardinal. A detailed list of bird species at the site is found in Appendix 4.B.

Monie Bay

The Monie Bay site is comprised of tidal creeks, open estuarine waters, marshes and pine forest areas. Most of the fast land is either high marsh or low marsh. The general terrain is flat, only a few feet above sea level, and has broad expansive marshes. Most of the wooded sections are dominated by loblolly pine with some green-brier and myrtle as understory.

The saltmarsh vegetation of this site is characteristic of East Coast mid-salinity regimes. Low marsh zones are dominated by smooth cordgrass, Spartina alterniflora, while high marsh areas have a mixture of saltmeadow cordgrass, Spartina patens, big cordgrass, Spartina cynosuroides, salt grass, Distichlis spicata, needlerush, Juncus roemerianus, marsh elder, Iva frutescens, and three square grass, Scirpus sp. Distribution of high marsh species is interspersed, with large patches of the different species throughout the site. Some areas of higher ground form islands of pine trees within the marsh. Dense beds of submerged aquatic vegetation, widgeon grass, Ruppia sp., have been reported in Little Monie Creek.

Fish species occurring in the numerous tidal creeks adjacent to the site include mummichog, white perch, spot, bluefish, and menhaden (Lesser and Saveikis, 1979). Common invertebrates include fiddler crabs, blue crabs, periwinkles, and grass shrimp (Lesser and Saveikis, 1979). A detailed list of species is found in Appendix 5.A.

This sanctuary site and the rest of the adjacent Deal Island Wildlife Management Area support abundant resident and migratory bird populations. Bald Eagles, osprey, and numerous hawk species are found here. One of the largest Great Blue Heron rookeries on the Eastern Shore is also found nearby. Waterfowl species in this area include Canada goose, snow goose, redhead, snowy egret, whistling swan, and clapper rail. Additional bird species are listed in Appendix 5.B.

B. Human Environment of the Chesapeake Bay

1. History

Rhode River

The site of the Rhode River Estuarine Sanctuary encompasses about 5 or 6 square miles of the lower Rhode River Watershed and includes most of the lands of the Smithsonian Institution's Chesapeake Bay Center For Environmental Studies (CBCES). The facility is located about 7 miles south of Annapolis, Maryland. The CBCES was established in 1965 with an initial bequeath to the Smithsonian of a 368 acre tract known as the Java Farm.

The Rhode River, or Road River, as it is referred to in history (known locally also as Rhodes River) is a subestuary on the western shore of the Chesapeake Bay. Artifacts from archeological digs indicate Indian settlements in this area dating back about 2,000 years. Shell piles and other relics suggest the region was inhabited by small tribes, perhaps including the Piscataway, which were forced westward to the Piedmont region by periodic raiding from the major nations of Potomac to the south and the Susquehanna to the north. Evidence of earlier settlement may lie in the sediments underlying the Chesapeake, which is considered to have intruded this area from the original river channel some 3,000 to 10,000 years ago. It is expected that disease and wars had reduced the area's Indian population considerably by Colonial times.

The area was settled in the early 1600's and was part of the West River "Hundred" or district, one of the 5 original districts in the Anne Arundel territory established by the Quakers who located in Maryland seeking a refuge from repressive laws in the colony of Virginia. Sanctuary was granted in Maryland by the Toleration Act which the Assembly passed in 1649. One of the founding grants of the West River Hundred was "Sparrows Rest" home of Thomas Sparrow on the "Road" River. Most of this early tract is today included in the Contee and Java Farms, part of the first acreage of the CBCES. The original settlement of Anne Arundel County centers around the migration of

ten Puritan families, who in gratitude for their relief from oppression in Virginia, called their new settlement Providence. The West River/Rhode River District was one of the centers of development in Providence. On April 29, 1650, an Act by the General Assembly created "... Of Providence into a County by the name of Ann Arundell". A town of Providence was also founded, was renamed "Town A Proctor's," then Anne Arundel Town, and later Annapolis, in honor of Princess Anne, later Queen.

Subsequent years of growth in Anne Arundel were principally agricultural in nature centering on tobacco, corn, and wheat. The lands near the water were settled first, usually in large tracts. Roads were few and most transportation was waterborne. Annapolis evolved as the principal government and commercial center in the colony. No new towns were established until about 1730.

The present rural population near the Rhode and West Rivers and much of Southern Anne Arundel, where agriculture continues as an important activity, is largely descended from the original colonists. Today, many of the waterfront lands have been withdrawn from agricultural use and developed for residential activity.

Monie Bay

During the early history or "precontact" period of the Monie Bay area, Indians of the Monie Tribe (possibly part of the Pocomoke Nation) occupied this region. Artifacts dating to 13,000 years old have been identified. Colonial settlement began circa 1665 with the movement of certain Quaker groups from "Eastern Shore" Virginia across the State line to Maryland seeking sanctuary from Virginia laws against Quaker activities. The boundaries of early Somerset were subdivided by parishes, each parish by 2 districts. The Monie "Hundred" or District was settled by both Quakers and members of the Church of England. Agriculture was the primary activity in the vicinity of Monie Bay, and remains so today; however, a gradual increase in the water level in this region of very flat terrain has caused a shift away from crop-intensive farming because of deteriorating soil drainage. Poultry production now dominates commercial agriculture followed by pulpwood harvesting and small grains. Seafood harvesting has also been a dominant activity over the years as evidenced by finds of oyster "middens" or shell piles which have been correlated with early Indian gathering activity.

The Monie District of Somerset parish, of which the Monie Bay area is a part, is estimated to have had a population of 900 people circa 1696. The combination of three primary factors--poorly drained soils, limited accessibility, and remote location relative to the commercial/industrial centers of the region and state--has served to limit development in this area.

2. Socioeconomic Characteristics

Rhode River

The Rhode River watershed has supported populations since colonial days. Agricultural activity, including the cultivation of corn and tobacco since 1650, continues today. Anne Arundel County, however, also is an important urban center. Annapolis, the County Seat, is located approximately 25 miles south of Baltimore, 35 miles east of Washington, D. C., and 7 miles north of the proposesd sanctuary. The county has a land area of about 416 square miles and a 1980 estimated population of 395,350 persons, about 10 percent of the State's. Annapolis, the only incorporated town, had a 1976 population of 32,145. The county enjoys predominantly well drained soils and the rural areas, particularly waterfront property, which is in relatively close proximity to the major centers of Washington and Baltimore, is under considerable development pressure. The extensive shoreline of the county has led to Anne Arundel's increasing popularity for recreation, particularly boating activity.

The 1978 average labor force was 164,684 people and unemployment was 4.6 percent. Approximately 42,470 residents are estimated to commute outside the county to work. Wage rates in September 1979 ranged from $2.90 to $6.50/hour. Median household income in December 1978 was $16,863 and per capita income was $5,961. Employment is concentrated in government, manufacturing, and trade sectors of the economy. A cross-section of industries includes research and development, synthetic fibers, chemicals, paper, automotive, food, structural steel, fertilizers, and electronics.

Anne Arundel Community College occupies 116 acres 10 miles north of Annapolis, and has an enrollment of over 6,500. St. John's College and the U.S. Naval Academy are both located in Annapolis. In the Baltimore/Washington area, there are over 70 institutions of higher education.

Monie Bay

Agriculture and seafood harvesting are the principal commercial activities in the area of Monie Bay and Somerset County, traditional pursuits which have continued for over 300 years. Tradition is important among the local population which can be characterized as an independent, self-reliant, and hardy culture with strong family and community ties. About 19,000 people live in Somerset County, which has a land area of 332 square miles, or a density of 57 persons per square mile.

The County has two urban centers: Princess Anne, the County seat, with 1,501 people, and Crisfield with a city population of 2,924. Princess Anne, situated in the north central part of the County on the major north/south arterial, U.S. Route 13, approximately 15 miles south of Salisbury, Maryland, serves as the government and commerce center for the County's rural hinterland. Crisfield is located in the south-westernmost corner of Somerset

County and is situated on the Chesapeake Bay. This city developed around an active commercial seafood industry and continues today as an important seafood and sport fishing center for the County and the State of Maryland. The balance of the County is predominantly rural in nature with occasional small residential clusters which often include a multipurpose general store/gas station. There are approximately 7,800 housing units in Somerset County.

The area surrounding the proposed sanctuary is predominantly marshy lowlands with a total estimated population of 1,300 persons. No community clusters are included in the sanctuary boundary. With the exception of secondary roads near the sanctuary perimeter, access is limited to pedestrian or waterborne traffic. The Monie Bay area is adjacent to and includes part of the State of Maryland's Deal Island Wildlife Refuge which comprises several thousand acres. Because of the high water table (at the surface in many places) and the remote location, development activity around Monie Bay has been absent and the potential for future development is considered negative. The high water table and flat terrain (max. elevation - 50 feet) has served to limit activity throughout the County primarily to agriculture. Some oystering and soft crab harvesting takes place in Monie Bay.

The County labor force average in 1978 was 8,874 persons. Unemployment for the same period averaged 15.3 percent as compared to the nine County eastern shore average of 8.4 percent for the same period. Wage rates in September 1979 ranged from $2.90 to $5.50/hour (Federal minimum wage - $3.10 effective January 1, 1980). An estimated 1,800 residents commute outside the County for work. A cross section of industries in Somerset County include seafood processing, tomato canneries, chicken production, and clothing assembly. Median household income in Somerset (December 1978) was $8,768 compared to $17,446 for Maryland and $16,231 for the United States. Per capita income in the County was $4,802. Somerset County is a popular recreation area for boating, fishing, and hunting. The town of Crisfield is regionally famous for steamed blue crabs from the Chesapeake Bay.

The University of Maryland, Eastern Shore Campus, is located in Princess Anne. The college, which has an enrollment of about 1,000 students, offers 13 undergraduate programs leading to B.A. and B.S. degrees and is headquarters for the University of Maryland Marine and Estuarine Environmental Studies Program (MEES). Salisbury State College in Salisbury, about 15 miles north of Princess Anne, offer B.S., A.B., M.A., and M. Ed. degrees.

3. Current Uses of the Sites

a. Commercial Shipping

Rhode River

There is no waterborne commerce nor any federally maintained navigation channels within the Rhode or West Rivers (U.S. Corps of Engineers, 1978). The designation of this site should, therefore, have no impact on waterborne commerce. The Baltimore Channel passes the mouth of the Rhode River at a distance of about 6 miles. No dredging of the main channel for maintenance or deepening appears to be necessary since channel depths reach 70-170 feet in this area (Fitzpatrick and Norman, 1980).

Monie Bay

The Wicomico River channel is a federally maintained channel which passes in close proximity to the mouth of Monie Bay (Fitzpatrick and Norman, 1980). This channel, which requires frequent maintenance dredging, is used largely to transport petroleum and petroleum products to Salisbury, Maryland. Other commodities include slag, aggregates, farm products, and fish and shellfish products (Table 1). Dredging of the nearby Great Shoals area is anticipated within the next year or two, and dredge material disposal sites are currently being sought. At one time, sites within the proposed sanctuary area had been considered for spoil placement through marsh creation (U.S. Army Corps of Engineers, 1978). However, use of these sites is not considered feasible by the Corps of Engineers at this time (Franklin, personal communication). The proposal to establish an estuarine sanctuary on the Monie Bay will not cause any interference or have any effect on maintenance dredging of the Wicomico River for navigation.

Table 1: Waterborne Commerce on the Wicomico River, 1979.

Number of Vessels	3500 to 4000
Destination	Salisbury, Maryland[1]
Cargo Review: (Short tons)	
Grains	4,500
Animal feed	1,600
Slag and aggregates	75,000
Shell fish	1,600
Petroleum products	826,900
Total Tonnage	909,600

[1] Salisbury serves as a distribution center for petroleum products in the general area of the Delmarva Peninsula from Cape Charles, Virginia to Seaford, Delaware. (Source: Delmarva Transport Committee, Inc.)

The traffic of petroleum past the proposed sanctuary site does present the possibility of adverse effects from potential oil spills, particularly if channels are not well maintained. Maintenance dredging itself should not have an impact on the sanctuary.

b. Commercial and Sport Fishing

Within Chesapeake Bay are some of the most productive commercial and sport fishing waters in the nation. Maryland leads the nation in oyster production and is second only to Virginia in blue crab landings. Striped bass, white perch, menhaden, and sea trout are important species to commercial netters, while sportfishermen catch bluefish, spot, striped bass, white perch, and sea trout. Maryland is also one of the leading producers of soft-shell clams.

Rhode River

Commercial fishing activity is almost nonexistent in the proposed sanctuary area of Muddy Creek. Some leased bottom for oyster culture is found near Big Island and some minor netting may occur here also. However, most commercial harvesting occurs further downstream in the lower Rhode River and West River. Recent commercial catch statistics are shown in Table 2. Sport fishing in this area is light and is done mostly from private boats.

Monie Bay

Commercial fishing, however, represents an important industry to Somerset County. Seafood related occupations are a large percentage of the work force in some communities, especially Crisfield. Commercial fishing activity in the Monie Bay area is centered mainly around private oyster culture on leased bottom, crabbing, and some commercial net fishing. Recent commercial catch statistics are summarized in Table 2.

Monie Creek, within the proposed sanctuary borders, is a popular local sport fishing area. Fishing is done both from the creek banks and private boats. The bank area near the proposed boat launching ramp is particularly popular with local residents. Species caught in the tidal creeks and Monie Bay include spot, croaker, bluefish, sea trout, and white perch.

Table 2: Commercial Fish and Shellfish Landings for Rhode River (Includes West River) and Monie Bay Area. (Oyster landings for Monie Bay include oysters harvested in the Wicomico River.)

Rhode River (1979)			Monie Bay (1979)		
Species	Pounds	Bushels	Species	Pounds	Bushels
Bluefish	62		Catfish	7,771	
Carp	92		Carp	640	
Seatrout	26		Seatrout	383	
Herring	27		Herring	560	
Striped Bass	0		Striped Bass	9,203	
White Perch	4,685		White Perch	9,227	
Menhaden	1,042		Blue Crabs	(not available)	
Oysters	(1980 data)	9,457	Oysters	(1980 data)	20,395

c. Recreational Boating

Rhode River

The Rhode River is a popular weekend rendezvous for recreational boaters. The river is well protected and has good water depth, thus making it an ideal anchorage. The areas to the northwest and east of Big Island and around High Island and Flat Island are particularly popular.

According to the Anne Arundel County Boating and Marina Study conducted in 1980 by the Anne Arundel County Office of Planning and Zoning, there are 11 boating facilities located on the eastern shore of the Rhode River. These facilities provide a total of 400 slips and 4 launching ramps.

The western shore of the river has only one launching ramp mainly because the majority of the land is owned by Camp Letts (a YMCA camp), and the Smithsonian Institution.

Monie Bay

The State of Maryland, as of December 1979, had 110,000 recreational boats registered. This is not reflective of the level of recreational boating use in the Monie Bay area of Somerset County. There are only three boating facilities within a 5-mile radius of the site. These facilities provide docking for transient boaters, 2 launching ramps and 30 slips.

Monie Bay lies southeast of the mouth of the Wicomico River, with the majority of the boats leaving and entering the river via a marked navigational channel which borders the western edge of the Bay. Little Creek water depths are shallow. Therefore, with the exception of flat bottom skiffs, the creek is not used for recreational boating. Monie Bay is not used for recreational boating, even though there are depths up to 6 feet. The low, marshy topography surrounding the bay makes it a poor anchorage and prone to large mosquito populations in summer and early fall.

4. Water Quality

Rhode River

Water quality parameters in the Rhode River have been sampled intensively by the Smithsonian Institution Chesapeake Bay Center for Environmental Studies since 1970. Much of the research conducted at the Center is designed to measure sources and magnitudes of chemical loadings from the watershed into the Rhode River. Earlier studies focused on inputs and effects of agricultural herbicides. More recently the emphasis has been on inputs of nutrients. Recent investigations have also examined effects associated with waterfront development.

Water quality in the Rhode River site meets the State of Maryland criteria for Class II waters, shellfish harvesting is allowed. Measured parameters associated with the process of eutrophication (such as nutrients and dissolved oxygen) are not at levels of concern. Levels of toxic substances (e.g., heavy metals, PCB's) are very low. Problems such as heavy metal loadings from increased recreational boating, or bacterial contamination from shorefront housing developments, have not been found. Coliform bacterial levels in Muddy Creek have caused this area to be closed to commercial shellfishing.

Monie Bay

Water quality in Monie Bay and surrounding tidal creeks meets the State of Maryland criteria for Class II waters, and are open to commercial shellfish harvesting. Previously, the Monie Bay area had been closed to oyster harvesting due to high coliform bacterial levels. However, intensive investigations of the surrounding watershed revealed the source of these fecal coliform inputs to be primarily from natural wildlife populations and not domestic origins. The waters were subsequently opened to shellfishing.

5. Land Use

Rhode River

The proposed estuarine sanctuary site is located in the Rhode River watershed which is about 7,400 acres in size. The watershed had a population of about 3,000 in 1973 and in 1976 had a land use composition as follows: 16 percent row crops, 2 percent fresh water swamp and ponds, 2 percent tidal wetlands, 59 percent forest and old fields, 10 percent pasture, and 11 percent commercial, residential, and other categories. The proposed sanctuary site, approximately 2,876 acres in area, is owned by the Chesapeake Bay Center for Environmental Studies and devoted to long term estuarine research. A large part of the research program at the center is concerned with man's effect on the watershed through air pollution, land use practices, and the changing pattern of land use brought about by a rapidly growing human population.

The goals of the watershed program include:

(1) the accurate measurement of the loading of the estuarine receiving waters with land runoff waters and the contents of the runoff waters;

(2) the determination of the present average area yield loading rates for each major land use category of the watershed for each parameter; This will enable accurate prediction of the effects of urbanization, etc., on diffuse source estuarine loading to be made by a deterministic approach;

(3) the determination of sufficiently detailed information on watershed characteristics, local meteorology, and runoff parameters from small single-use watersheds, typical of each major land use category to allow the development of mechanistic predictive models;

(4) the determination of the effects of variations in land use practices upon runoff from each major land use category;

(5) testing the results and predictions derived from studies of the Rhode River watershed for their validity or transferability to other coastal plain watersheds in this region; and

(6) developing a tested methodology for application in other regions.

The land use in the watershed surrounding the proposed site is not expected to change appreciably in the near future since it is zoned rural-agricultural (maximum density one unit per 2 acres) and public water and sewer services which would allow more dense development are not planned to be provided to the area.

Monie Bay

The proposed estuarine sanctuary is largely contained within the Deal Island State Wildlife Management Area owned and operated by the Maryland Department of Natural Resources. A total of approximately 2,550 acres of land would be designated for sanctuary useage. Roughly 311 acres of this total are not presently under state ownership. No residences or other structures are located within proposed acquisition boundaries.

The surrounding wildlife management area contains a total of 11,733 acres and consists almost entirely of wetlands. An additional 3,467 acres is anticipated to be added to the wildlife area in the coming years. Mixed softwood tree stands are located southwest and southeast of the sanctuary. Koppers Company Inc., a timber harvesting operation, presently owns a 395-acre parcel contiguous to the site and may ultimately harvest the timber stands. The Chesapeake Corporation of Virginia also engages in timber harvesting and owns a 62-acre tract adjacent to the sanctuary to the northeast.

The Somerset County Comprehensive Plan generally classifies the area as unsuitable for agricultural uses and has further identified these lands as having high wetland preservation value. Further comprehensive plan maps call for the entire sanctuary to remain as open space with portions adjacent to the west and some of the south designated "open space, agricultural."

Present zoning classifications are also compatible with the sanctuary, due to adjacent lands having a "conservation" designation and areas located to the south and east being designated "agricultural."

Hunting and sport fishing are permitted on the site with some commercial fishing occurring on Monie Bay. Two small unincorporated communities, St. Stephens and Monie, provide year around housing for local watermen and retired citizens. A total of approximately 32 dwellings are located in the vicinity, none of which are reported as seasonal residences.

PART IV: ENVIRONMENTAL CONSEQUENCES

A. Environmental Impacts of the Proposed Action

1. General Impacts

Awarding of the land acquisition grant by NOAA would enable the State of Maryland to purchase additional lands, which, combined with the other protected lands already owned by the State, would establish a National Estuarine Sanctuary representative of the Chesapeake Bay as a subcategory of the Virginian biogeographic region. The proposed action would have a variety of environmental and economic impacts.

Creation of this estuarine sanctuary would initiate a long-term learning process for research and education regarding estuarine systems and dynamics. It would allow coastal zone decisionmakers and members of the public to become more cognizant of how best to utilize the Bay's natural resources or protect their important benefits for long-term usage. This would apply not only for this, but for other Virginian type estuaries as well. Such use will have little, if any, detrimental effect upon the environment, and will be of vital importance to the development of rational coastal zone management programs at the local, State, and regional levels. It is anticipated that this would be a positive environmental impact.

Another positive effect of the establishment of the sanctuary would be to assure the permanent protection and management of productive, relatively undisturbed estuarine areas. By protecting the marshes and wetlands, the water quality would also be maintained and development would be precluded, thereby avoiding a potential flood hazard to people and property that would occur if the lands were developed, as well as preventing the irreversible damage to the environment that would be caused by the loss of wildlife, vegetation, fish, and other marine life. Sanctuary designation does not preclude human activities within the sanctuary boundaries, but it would prevent those that cause significant degradation of the system, either by outright destruction or by overuse. The scientific research conducted in the sanctuary will assist in this control and will provide for the enhancement of the economic and environmental resources of this and other estuaries. A further positive benefit of the sanctuary after all the sites are established will be its direct contribution to the management of research coordination in various parts of the Bay.

The following is a brief synopsis of the conclusions regarding the anticipated net impacts associated with the designation of a National Estuarine Sanctuary in the Chesapeake Bay in the Rhode River and Monie Bay sites.

2. Local Impacts

The areas in which the proposed sanctuary will be located are currently rural in character. The sanctuary will have the long-term non-quantitative benefit of protecting and enhancing the local community's desired objective of retaining its natural resource base.

In terms of renewable and non-renewable resources, the net impact of the sanctuary is expected to be beneficial. The economic benefits associated with the maintenance of valuable fishing and wildlife resources are expected to far outweigh the relatively minor negative impacts associated from preclusion of development within the sanctuary boundary.

There will be positive impacts on water quality within the two sites due to the long-term protection afforded by sanctuary status. Designation of these areas as part of the Chesapeake Bay Estuarine Sanctuary can also provide additional protection to waters draining into the sanctuary and downstream estuarine areas. This should result mainly from increased consideration of the importance of these areas for environmental research and education on the part of government permitting agencies. Boat traffic is not expected to increase to levels that would change water quality.

Land acquisition for the proposed sanctuary will have several effects, the net impact of which is anticipated to be positive. Although there will be a small loss in tax revenues each year in Somerset County due to removal of approximately 200 acres of land from the tax base, this shortrun loss is expected to be completely offset by a longrun rise in adjacent property values and tax revenues partially attributable to the operation of the sanctuary. In the long run, the impacts of purchasing this land are minimal, since the lands are generally unsuitable for development and there is a low growth potential for the area.

The sanctuary itself will provide a small, though long term stimulus to local employment. In the long run, the existence of the sanctuary is expected to ensure continued employment in the commercial fishing industry in the Monie Bay area, have a positive impact on employment in the service industry (tourism, research, and education), and the proposed sanctuary will in turn, stimulate an increased supply of facilities and services to meet that demand.

Activities associated with the sanctuary will have a positive impact on the local economy. The annual operating budget will provide a small, but long term, stimulus to the local economy. In addition, the sanctuary is expected to stimulate additional State and Federal funding for research activities in the area. The proposed educational facilities will provide non-quantifiable educational benefits to the public, and its visitors will exert a positive impact on local economic activity.

Rhode River

The proposed sanctuary will incorporate most of those areas now controlled by the Chesapeake Bay Center for Environmental Studies including purchased legal covenants and fee simple title. These lands will be protected and available for long-term ecological research for the foreseeable future. Sanctuary designation will serve to further highlight this area as a site to be preserved and will enhance State and local efforts to maintain this system in a natural state.

It is not anticipated that visitation will significantly disrupt local residents over present existing levels of traffic. Potential adverse impacts, such as destruction of vegetation or disruption of research projects, will be prevented by controlling visitation through organized tours. Large visitor groups will have to schedule visits in advance and tours will be supervised by sanctuary staff along restricted trails.

Monie Bay

Fish and wildlife habitat at this site are already protected throughout most of its extent by the Deal Island Wildlife Management Area. Sanctuary designation will further enhance protection efforts in this area, but will also extend additional protection into land parcels to be acquired.

Approximately 86 people reside in the unincorporated areas of Monie and St. Stephens surrounding the proposed sanctuary. None of these residents would be displaced as a result of the proposed action. Prior to initiating a development program for the sanctuary, DNR Coastal Resources Division staff held a public meeting with adjacent land owners to determine their concerns and minimize the adverse impacts of the sanctuary upon them. As a result, certain adjustments to the preliminary estuary site boundaries were made which allayed fears of residents that too much additional acreage would be acquired in light of the extensive holding of the State in the vicinity. The projected estuarine sanctuary boundaries and planned acccess points should also reduce concerns associated with invasion of privacy.

It is anticipated that very little spontaneous visitation by the public will occur. Planned access points are not readily available from heavily traveled arterials. Detailed access plans have not been formulated, however, the following entry points are probable:

i. Entry and parking via Drawbridge road below Monie Creek onto an easement passing through the Phillips property. (Visitor Center/ interpretative trail potentially located here.)

ii. Entry and parking via Mount Vernon Road to Drawbridge Road onto State property north of Monie Creek. (Boat access to Monie Bay, Little Monie Creek.)

iii. Dropoff point at the junction of Deal Island Road and the headwaters of Little Creek (Small non-motorized boat access.)

The Department of Natural Resources owns a lodge within a 10-minute drive of the site. The lodge serves as living quarters for the Deal Island Wildlife Management Area conservationist and informally provides overnight quarters for visiting research groups. The lodge can potentially provide this function on a formal basis as well as serving other purposes relating to research. Additional improvements would be necessary for any formal arrangements of this nature.

Acquisition of approximately 311 acres for sanctuary use would result in the loss of tax revenue to Somerset County which would currently amount to $135.00 per year. This nominal economic loss would be more than offset by expenditures for housing, equipment, food, and supplies by the sanctuary manager and staff in the area.

3. State and Federal Impacts

Establishment of the sanctuary would preserve for Marylanders, others, and particularly Somerset County residents, a natural area to enjoy and use for recreational and educational purposes.

Acquisition and management of the proposed sanctuary would have relatively minor short-term financial impacts on the Federal Government and the State of Maryland. Long-term operations of the sanctuary could be funded by the State. These expenditures are expected to be offset by the value of improved scientific and technical knowledge gained from research efforts which could be applied to estuarine management in many areas of the Chesapeake Bay. The sanctuary would also protect wetlands and floodplains, in accordance with Presidental Executive Orders 11990, Protection of Wetlands, and 11988, Floodplain Management.

B. Unavoidable Adverse Environmental or Socioeconomic Impacts

Rhode River

Since this proposed sanctuary site is already being used by the Chesapeake Bay Center for Environmental Studies, the establishment of the estuarine sanctuary will have little impact on residents of adjacent areas. It is expected that educational use of the area will be largely through scheduled group visits to the area, thus limiting the potential for disturbance to owners of adjacent property by public use of the area. If a visitor center is to be constructed to promote the use of the area for environmental education purposes, its location will be carefully selected to ensure there is adequate access to it and that it is a sufficient distance away from adjacent property and the sensitive portion of the sanctuary site to avoid adverse impacts on property owners and sanctuary resources from its construction and use.

Impacts on soils and vegetation due to visitor activity would be minimized at this site by utilizing existing roads and trails for visitor access. The upland forest areas have well drained soils and would not experience significant compaction from trail use. Most marsh areas could be viewed from upland areas. However, in order to allow visitors to closely examine marsh vegetation zones, a boardwalk will be constructed to prevent disturbance of the plants.

Monie Bay

Unavoidable adverse environmental effects on the Monie Bay site associated with this proposed action are as follows:

Adverse impacts could potentially result from increased numbers of visitors to the sanctuary. Visitation will be controlled similarly to the Rhode River site with limited access points and guided tours. By controlling the points of access, impacts will be minimized due to the small area actually traversed relative to the large total acreage of this site. However, establishment of the proposed sanctuary could result in some minor disruptions to the residents of Somerset County from increased traffic, litter, and noise.

To prevent disturbance of the poorly drained soils and dense marsh vegetation within the sanctuary, visitor access will be maintained at only two locations. At the Drawbridge Road boat ramp area in the northern part of the sanctuary, visitor impacts will be minimal because an existing road bed and parking area will be used. The other access point will consist of a new trail to be cut through a pine forest and a boardwalk extending out over the marsh. There will be some initial negative, but not significant, impacts on vegetation at this point due to trail construction, in order to create new opportunities for marsh educational programs at this location.

Unavoidable economic effects are limited to an annual loss of tax revenue (estimated at $135.00) to Somerset County resulting from acquisition of approximately 311 acres. The property involved enjoys a preferential graduated assessment from $20/acre for marsh wetlands to $100/acre for Class C agriculture land, assessed value (current tax rate is $2/100 assessed value).

Some revenues will accrue to local government and business from transient lodging, food and sundry purchases generated by occasional sanctuary visitors including research teams, educational groups, and other interested individuals. This new income to the county is expected to exceed the losses of property tax revenue.

NOTE: Since new construction would result at both sites, if this acquisition grant is awarded (e.g., marsh boardwalks, boat ramp, and visitor's center), an environmental assessment will be required as a grant award condition before money is granted for any construction.

C. Relationship Between Local, Short-Term Uses of the Environment, and the Maintenance and Enhancement of Long-Term Productivity

Existing short-term uses and those new short-term uses resulting from sanctuary designation will be consistent with the maintenance and enhancement of long-term productivity at the two sites. Presently, the Monie Bay site is being used for wildlife management purposes, while the Rhode River site is used for estuarine research and education. These ongoing activities

along with the establishment of an estuarine sanctuary will protect and maintain the long-term productivity of the affected environment. As sanctuary sites, they will be protected from development pressures. Enhancement in the Chesapeake Bay estuary as a whole should also result from the research conducted here and increased public awareness developed in the educational programs.

D. Irreversible or Irretrievable Commitments of Resources

There will be no irreversible or irretrievable commitments of resources resulting from sanctuary designation. The goals of the sanctuary program are centered around keeping this environment in a natural, unaltered state and, therefore, preclude this. Minor alterations to the marsh at access points could eventually be restored to their unaltered state.

E. Possible Conflicts Between the Proposed Action and the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls for the Area Concerned

The establishment of the proposed sanctuary would be consistent with the objectives of Federal, Regional, State, and local land use plans.

1. Federal and Regional Plans

Federal and regional plans for the area focus upon the efforts of the Environmental Protection Agency's (EPA) Chesapeake Bay Program, and the Chesapeake Bay Research Coordination Act of 1980. These programs fund a wide range of studies to achieve improved understanding of the complex and productive Chesapeake Bay estuary as a single system. Establishment of the sanctuary will significantly enhance these programs and the data derived from future research efforts here and throughout the Bay may one day provide a basis for improved management of this vital resource.

2. State Plans

Maryland State plans for the area are developed by the Department of Natural Resources and the Department of State Planning.

Within the Department of Natural Resources, the policies and programs of the Tidewater Administration and Wildlife Administration are consistent with the establishment of a sanctuary. Both agencies are currently cooperating on the implementation of the proposed project.

The State Comprehensive Outdoor Recreation Plan (SCORP) coordinated by the Department of State Planning recognizes a need for the proposed facility. Final development of the facility with an interpretative trail component would ultimately fulfill additional recreation opportunities identified in the SCORP within two categories--unique natural areas and walking trails.

3. Local Plans

Rhode River

The Anne Arundel County Comprehensive Plan indicates that the area in which the site is located is presently largely rural in nature, and is expected to remain so. Some consideration is being given by the county to make its rural/agricultural zoning more restrictive which will only help to maintain the present character of the area in which the proposed site is located. Similarly, the establishment of agricultural districts to preserve agricultural lands, which is being promoted in the county's rural areas, including the area around the site, will only contribute to maintenance of the area's present character, and thus enhance the long-term visibility of the proposed sanctuary.

Monie Bay

The Somerset County Comprehensive Plan calls for the proposed sanctuary to remain as open space because of the high wetland preservation values associated with the area. No current or planned zoning designations are inconsistent with the proposed use.

PART V: LIST OF PREPARERS

Mr. Frank Christhilf -- U.S. Department of Commerce

Mr. Christhilf holds both the B.E. and M.L.A. degrees and has completed extensive graduate work in environmental law and public policy. He is the Estuarine Sanctuary Project Officer for the East Coast (including Virgin Islands, Puerto Rico) and the Great Lakes. While his major background is in the area of public administration, he also has worked as a professional engineer, as well as a surveyor. He served for 8 years as a member of a standing committee of the Arlington County Planning Commission, Arlington, Virginia.

His responsibilities in the preparation of the DEIS included overall direction, organization, and preparation of the report for publication. Mr. Christhilf had assistance from Mr. James W. MacFarland, Estuarine Sanctuary Program Manager, and Ms. Gloria D. Thompson, Program Support Specialist, Estuarine Sanctuary Program Office.

Dr. John B. Williams -- Maryland Department of Natural Resources

Dr. Williams received his B.S. in Zoology and his Ph.D. in Marine Science. He has extensive experience in estuarine research and has more recently been involved with developing management approaches towards Maryland's coastal resources as part of the State Coastal Zone Management.

His responsibilities in preparing this document included overall direction of the DEIS, organizing its different sections, and writing portions of all four sections.

Dr. Sarah J. Taylor -- Maryland Department of Natural Resources

Dr. Taylor holds a B.A. degree in Political Science, an M.P.A. in Public Administration, and a Ph.D. in Public Administration, particularly Natural Resources Administration. She is presently Director of the Coastal Resources Division within Maryland's Tidewater Administration. Her background includes working as an Administrator as well as implementor of projects with the U.S. Army Corps of Engineers and the Delaware River Basin Commission.

Dr. Taylor wrote portions of the Purpose and Need for Action Section and Alternatives Section.

Mr. James T. Anthony -- Maryland Department of Natural Resources

Mr. Anthony has extensive background in urban and rural planning, economic assessment and fiscal analysis, facility and site location, and market feasibility analysis. He has worked as a planning director and a real estate and planning consultant, for over 8 years. Other experience includes energy and coastal planning projects and review of Major Facility and Transportation Environmental Impact Statements.

Mr. Anthony has a B.S. degree in Geography and Political Sciences and post-graduate studies in city planning and urban geography leading to a M.A. Degree.

Mr. Anthony wrote parts of the Environmental Consequences and Affected Environment Sections.

Mr. Earl H. Bradley -- Maryland Department of Natural Resources

Mr. Bradley is presently the (Local) Technical Assistance Program Manager for the Coastal Resources Division, Tidewater Administration. He has a Sc.B. Degree in Engineering, a M.A. in Science, Technology & Public Policy, and a Masters in Regional Planning. He has worked with the Maryland Department of Natural Resources from the inception of Maryland's Coastal Zone Program to its present implementation.

He drafted portions of the Affected Environment and Environmental Consequences Sections with materials provided by the Chesapeake Bay Center for Environmental Studies and the Somerset County government.

Mr. David G. Burke -- Maryland Department of Natural Resources

Mr. Burke has a M.A. Degree in Urban and Regional Planning and has a broad background in the land use planning field. He has worked for local governments and consulting firms in Colorado and has been project manager for a number of airport environmental assessments, watershed studies, solid waste plans, and other comprehensive planning projects.

Mr. Burke wrote portions of the Environmental Consequences and Affected Environment Sections of this document.

Ms. Kathy H. Fitzpatrick -- Maryland Department of Natural Resources

Ms. Fitzpatrick holds a B.S. in Recreational Resource Management and is a Marine Recreation Specialist for Maryland's Coastal Zone Management Program. Ms. Fitzpatrick has experience in River Management Planning, Environmental Analysis and Recreational Boating Safety and Management. Ms. Fitzpatrick is also co-editor of The Guide For Cruising Maryland Waters, a marine atlas of the Maryland portion of the Chesapeake Bay and its tributaries.

Ms. Fitzpatrick prepared portions of the Affected Environment Section.

Mr. Jeffrey H. Hutchins -- Maryland Department of Natural Resources

Mr. Hutchins holds both a B.S.C.E. and M.S.C.E. in civil engineering and has a background that includes water resources planning, design, and construction. For the State of Maryland, Mr. Hutchins has worked on capital projects, dredging studies, and watershed management.

Mr. Hutchins wrote part of the Affected Environment Section.

Ms. Margaret Johnston -- Maryland Department of Natural Resources

Ms. Johnston holds a B.A. in Zoology and a M.S. in Natural Resources. She has extensive experience in coastal zone policy formulation and intergovernmental coordination. She has recently worked on programs for improving Maryland-Virginia cooperative management of Chesapeake Bay.

Ms. Johnston wrote part of the Affected Environment Section.

Mr. Randall T. Kerhin -- Maryland Department of Natural Resources

Mr. Kerhin holds a M.A. Degree in Geology. He is employed by the Maryland Geological Survey as Program Chief of Coastal and Estuarine Geology Programs. He is the author of several articles and technical reports on sedimentation in Chesapeake Bay and along Maryland's ocean coast.

Mr. Kerhin assisted in the preparation of part of the Affected Environment Section.

Mr. Chris Ostrom -- Maryland Department of Natural Resources

Mr. Ostrom has a M.S. Degree in Biological Oceanography and over 6 years' experience in coastal area management with Maryland's Coastal Zone Management Program. He has been involved in a variety of environmental studies in Chesapeake Bay and also OCS activities and ocean dumping.

Mr. Ostrom wrote a portion of the Affected Environment Section.

Dr. Chris Zabawa -- Maryland Department of Natural Resources

Dr. Zabawa holds a Ph.D. in Geology and is the author of several articles on sedimentation processes in the northern Chesapeake Bay estuary. He has been employed as a geologist in the Maryland Geological Survey, and the Coastal Resources Division of the Maryland Department of Natural Resources.

Dr. Zabawa prepared part of the Affected Environment Section.

Mr. Scott Brumburgh -- Maryland Department of Natural Resources

Mr. Brumburgh received his B.S. in Sociology and his M.S. in Resource Economics. His background includes directing public involvment activities in Maryland's Coastal Zone Program and coordinating government and public groups in developing coastal economic-environmental policies.

Mr. Brumburgh assisted in preparing the List of Agencies, Organizations, and Persons Receiving Copies.

Mr. Elder Ghigiarelli -- Maryland Department of Natural Resources

Mr. Ghigiarelli holds a M.S. in Resource Management and over 6 years' experience in coastal area management with Maryland's Coastal Zone Management Program. He presently directs the Program's Project Evaluation Section. Prior to this he coordinated the State's Sanctuary Program efforts from 1975 to 1978.

Mr. Ghigiarelli wrote the September 1975 Estuarine Sanctuary Selection Process Report contained in Appendix 3.

PART VI: LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS RECEIVING COPIES

Federal Agencies

Advisory Council on Historic Preservation
Department of Agriculture
Department of Commerce
Department of Defense
Department of Energy
Department of Health and Human Services
Department of Housing & Urban Development
Department of the Interior
Department of Justice
Department of Labor
Department of Transportation
  U.S. Coast Guard
Environmental Protection Agency
Federal Energy Regulatory Commission
Naval Battalion Construction Center
Naval Underwater System Center
Naval War College
Nuclear Regulatory Commission

National Interest Groups

A.M.E.R.I.C.A.N.
AFL-CIO
American Association of Port Authorities
American Bureau of Shipping
American Farm Bureau Federation
American Fisheries Society
American Gas Association
American Industrial Development Council
American Institute of Architects
American Petroleum Institute
American Shore and Beach Preservation Association
American Society of Civil Engineers
American Society of Landscape Architects, Inc.
American Society of Planning Officials
American Waterways Operators
Amoco Production Company
Atlantic Richfield Company
Atomic Industrial Forum
Boating Industry Association
Bultema Dock & Dredge Company

Center for Law and Social Policy
Center for Natural Areas
Center for Urban Affairs
Center for Urban and Regional Resources
Chamber of Commerce of the United States
Chevron U.S.A., Inc.
Cities Service Company
Coast Alliance
Conservation Foundation
Continental Oil Company
Council of State Planning Agencies
The Cousteau Society
CZM Newsletter
Edison Electric Institute
El Paso Natural Gas Co.
Environmental Policy Center
Environmental Defense Fund, Inc.
Environmental Law Institute
EXXON Company, U.S.A.
Friends of the Earth
Great Lakes Basin Commission
Gulf Energy and Minerals, U.S.
Gulf Oil Company
Gulf Refining Company
Industrial Union of Marine and Shipbuilding
  Workers of America
Institute for the Human Environment
Interstate Natural Gas Association of America
Lake Michigan Federation
Marathon Oil Company
Marine Technology Society
Mobil Oil Corporation
Mobil Exploration and Producing, Inc.
Murphy Oil Company
National Association of Conservation Districts
National Association of Counties
National Association of Home Builders
National Association of Realtors
National Audubon Society
National Coalition for Marine Conservation, Inc.
National Farmers Union
National Federation of Fisherman
National Fisheries Institute
National Forest Products Association
National Marine Manufacturers Association
National Ocean Industries Association
National Parks and Conservation Association
National Recreation and Park Association
National Research Council

National Society of Professional Engineers
National Waterways Conference
National Wildlife Federation
Natural Resources Defense Council
Natural Resources Law Institute
The Nature Conservancy
Norfolk Dredging Company
Outboard Marine Corporation
Resources for the Future
Rose, Schmidt & Dixon
Shell Oil Company
Sierra Club
Skelly Oil Company
Soil Conservation Society of America
Sport Fishing Institute
Standard Oil Company of Ohio
State University Law School
State University of New York
Sun Company, Inc.
Tenneco Oil Company
Texaco, Inc.
Texas A & M University
Union Oil Company of California
University of Pittsburgh
Urban Research and Development Association, Inc.
Western Oil and Gas Association
Wildlife Management Institute
The Wildlife Society
Woods Hole Oceanographic Institute

Congressional

Honorable Roy Dyson
Honorable Marjorie S. Holt
Honorable Charles McMathias
Honorable Barbara A. Mikulski
Honorable Paul Sarbanes

State Agencies

Delmarva Advisory Council
Department of Agriculture
Department of Economic and Community Development
Department of Health and Mental Hygiene
Department of Natural Resources
Department of State Planning
Department of Transportation
Governor's Office
Maryland Boat Act Advisory Committee
Maryland Environmental Trust
Maryland General Assembly
Maryland-National Capital Park and Planning Commission
Maryland Port Administration

Metropolitan Washington Council of Governments
Regional Planning Council
Virginia Council on the Environment
Virginia Office of the Secretary of Commerce and Resources

State and Local Special Interest Groups

Members of the Coastal Resources Advisory Committee:

Applied Physics Laboratory
Center for Environmental and Estuarine Studies
Chesapeake Bay Center for Environmental Studies
Chesapeake Bay Institute
University of Maryland Graduate School
Bethlehem Steel Corporation
Chesapeake Bay Foundation
Chesapeake Bay Yacht Club Association
Chesapeake Research Consortium
Delmarva Power and Light Company of Maryland
Home Builders Association of Maryland
Izaak Walton League
League of Women Voters of Maryland
Maryland Association of Counties
Maryland Association of Realtors
Maryland Association of Soil Conservation Districts
Maryland Bankers' Association
Maryland Chamber of Commerce
Maryland Conservation Council
Maryland Farm Bureau
Maryland Petroleum Association
Maryland Watermen's Association
Maryland Wetlands Committee
Maryland Wildlife Federation

Prince George's County Audubon Society

Anne Arundel and Somerset Counties - Local Interest Groups

Anne Arundel County Council
Chambers of Commerce
County Planning and Zoning Offices
Local Farm Organizations
Local Watermens' Associations
League of Women Voters' Chapters
Maryland State Bar Association
Soil Conservation Districts
Somerset County Board of Commissioners
Sportsmen Clubs

Individuals

Langford Anderson
Pete & Elaine Bridgman
Jim Court
Floyd R. Evans
Robert S. Fitzgerald
Dr. James W. Gallagher
Captain & Mrs. E. A. Grunwald
Homer F. King
Y. Kirkpatrick-Howat
Koppers Co., Inc.
Clarence Laird
Robert E. Laird
Everett Lawson
Donald W. Mabe
Mr. and Mrs. Robert May
Calvin W. McDaniel
Brian A. McDonald
James W. Phillips
D. E. Wilson
Larry Zang

State Universities, Colleges, and Schools

American University - Biology Department
Maryland Sea Grant Program
Salisbury State College
The Johns Hopkins University - Chesapeake Bay Institute
University of Maryland - Eastern Shore Campus
University of Maryland at Horn Point
Virginia Institute of Marine Science
Virginia Polytechnical Institute and State University
Virginia Sea Grant Program

PART VII: APPENDICES

Appendix 1: Estuarine Sanctuary Guidelines, 1974 and 1977.

Appendix 2: Estuarine Sanctuary Steering Committee Membership List.

Appendix 3: Maryland's Estuarine Sanctuary Site Selection Process.

Appendix 4A: Listing of Rhode River Fish Species

Appendix 4B: Listing of Rhode River Bird Species

Appendix 5A: Listing of Monie Bay Fish Species

Appendix 5B: Listing of Monie Bay Bird Species

APPENDIX I

Estuarine Sanctuary Guidelines, 1974 and 1977

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[15 CFR Part 921]

ESTUARINE SANCTUARY GUIDELINES

Policies and Procedures for Selection

Acquisition and Management

AGENCY: National Oceanic and Atmospheric Administration, Department of Commerce.

ACTION: Proposed rule.

SUMMARY: This proposed rule will allow the National Oceanic and Atmospheric Administration to make a preliminary acquisition grant to a State to undertake a fair market value appraisal, and to develop a uniform relocation act plan, a detailed management plan and a research framework for a proposed estuarine sanctuary, developed pursuant to Section 315 of the Coastal Zone Management Act of 1972, as amended.

DATE: Comments must be received on or before October 1, 1977.

FOR FURTHER INFORMATION CONTACT:

Robert R. Kifer, Physical Scientist, Policy and Programs Development Office, Office of Coastal Zone Management, 3300 Whitehaven Parkway, Page One Building, Washington, D.C. 20235 (202–634–4241).

SUPPLEMENTARY INFORMATION: On June 4, 1974, The National Oceanic and Atmospheric Administration (NOAA) published 15 CFR Part 921 entitled, "Estuarine Sanctuary Guidelines" pursuant to then section 312 of the Coastal Zone Management Act of 1972, as amended, for the purpose of establishing policy and procedures for the selection, acquisition, and management of estuarine sanctuaries.

Under new subsection 315(1) of the Act, the Secretary of Commerce is authorized to make available to coastal States grants of up to 50 per centum of the cost of acquisition, development, and operation of estuarine sanctuaries. In general, subsection 315(1) provides that grants may be awarded to States on a matching basis to acquire, develop, and operate natural areas as estuarine sanctuaries in order that scientists and students may be provided the opportunity to examine over a period of time ecological relationships within the area. The purpose of these guidelines is to implement this program.

As a result of two years of program implementation, the regulations are proposed to be modified to specifically authorize the granting of acquisition money to States in two stages:

(i) An initial grant for such preliminary purposes, as surveying and assessing the land to be acquired, and the development of management procedures and research programs; and

(ii) A second grant for the actual acquisition of the land. The Federal share of the sum of the two grants shall not exceed 50 percent of the acquisition costs involved. Any State receiving an initial grant shall be obligated to repay it if, due to any fault of the State, the sanctuary is not established.

As a result of this new grant procedure, much more information relating to costs, values, management procedures, and research programs will be available at the time of the publication of a draft environmental impact statement. Proposals made public to date in the form of an Environmental Impact Statement (EIS) have been criticized for lack of specificity in these areas. By making a small preliminary acquisition grant to a State, the estuarine sanctuary proposal can be more fully developed and the public can become more aware of the costs and the exact nature of the long-term management.

In response to State questions about estuarine sanctuary research, the proposed regulations provide that such research can be funded if it can be shown to be related to program administration.

NOAA has reviewed these proposed regulations pursuant to the National Environmental Policy Act of 1969 and has determined that promulgation of these regulations will have no significant impact on the environment.

Compliance with Executive Order 11821. The economic and inflationary impact of these proposed regulations has been evaluated in accordance with OMB Circular A–107 and it has been determined that no major inflationary impact will result.

Dated: August 26, 1977.

T. P. GLEITER,
Assistant Administrator for Administration.

It is proposed to amend 15 CFR Part 921 as follows:

(1) By revising the table of contents and authority citation to read as follows:

Subpart A—General

Sec.
921.1 Policy and objectives.
921.2 Definitions.
921.3 Objectives and implementation of the program.
921.4 Biogeographic classification.
921.5 Multiple use.
921.6 Relationship to other provisions of the Act and to marine sanctuaries.

Subpart B—Application for Grants

921.10 General.
921.11 Application for preliminary acquisition grants.
921.12 Application for land acquisition grants.
921.13 Application for operational grants.
921.14 Federally-owned lands.

Subpart C—Selection Criteria

921.20 Criteria for selection.
921.21 Public participation.

Subpart D—Operation

921.30 General.
921.31 Changes in the sanctuary boundary, management policy, or research program.
921.32 Program review.

AUTHORITY: Sec. 315(1), Coastal Zone Management Act of 1972, as amended (90 Stat. 1030, (16 U.S.C. 1461) Pub. L. 94–370).

(2) By revising Subpart B—Application for Grants—as follows:

Subpart B—Application for Grants

§ 921.10 General.

Section 315 authorizes Federal grants to coastal States so that the States may establish sanctuaries according to regulations promulgated by the Secretary. Coastal States may file applications for grants with the Associate Administrator for Coastal Zone Management (OCZM), Office of Coastal Zone Management, Page 1, 3300 Whitehaven Parkway NW, Washington, D.C. 20235. That agency which has been certified to the Office of Coastal Zone Management as the entity responsible for administration of the State coastal zone management program may either submit an application directly, or must endorse and approve applications submitted by other agencies within the State.

§ 921.11 Application for preliminary acquisition grants.

(a) A grant may be awarded on a matching basis to cover costs necessary to preliminary actual acquisition of land. As match to the Federal grant, a State may use money, the cost of necessary services, the value of foregone revenue, and/or the value of land either already in its possession or acquired by the State specifically for use in the sanctuary. If the land to be used as match already is in the State's possession and is in a protected status, the State may use such land as match only to the extent of any revenue from the land foregone by the State in order to include it in the sanctuary. Application for a preliminary acquisition grant shall be made on form SF 424 application for Federal assistance (non-construction programs).

(b) A preliminary acquisition grant may be made for the defrayal of the cost of:

(1) An appraisal of the land, or of the value of any foregone use of the land, to be used in the sanctuary;

(2) The development of a Uniform Relocation Assistance and Real Property Acquisition Policies Act plan;

(3) The development of a sanctuary management plan;

(4) The development of a research and educational program; and/or,

(5) Such other activity of a preliminary nature as may be approved in writing by OCZM. Any grant made pursuant to this subsection shall be refunded by the State to whatever extent it has spent in relation to land not acquired for the sanctuary, and if OCZM requests such refund.

(c) The application should contain:

(1) Evidence that the State has conducted a scientific evaluation of its estuaries and selected one of those most representative.

(2) Description of the proposed sanctuary including location, proposed boundaries, and size. A map(s) should be included, as well as an aerial photograph if available.

(3) Classification of the proposed sanctuary according to the biogeographic scheme set forth in § 921.4.

(4) Description of the major physical, geographic, biological characteristics and resources of the proposed sanctuary.

(5) Demonstration of the necessary authority to acquire or control and manage the sanctuary.

(6) Description of existing and potential uses of, and conflicts within, the area if it were not declared an estuarine sanctuary; and potential use restriction and conflicts if the sanctuary is established.

(7) List of protected sites, either within the estuarine sanctuaries program or within other Federal, State, or private programs, which are located in the same region or biogeographic classification.

(8) The manner in which the State solicited the views of interested parties.

(9) In addition to the standard A–95 review procedures. the grant application should be sent to the State Historic Preservation Office for comment to insure compliance with section 106 of the National Preservation Act of 1966.

(d) In order to develop a truly representative scheme of estuarine sanctuaries, the States should coordinate their activities. This will help to minimize the possibility of similar estuarine types being proposed in the same region. The extent to which neighboring States were consulted should be indicated.

§ 921.12 Application for land acquisition grants.

(a) Acquisition grants will be made to acquire land and facilities for estuarine sanctuaries that have been thoroughly described in a preliminary acquisition grant application, or where equivalent information is available. Application for an acquisition grant shall be made on SF 424 application for Federal assistance (construction program).

In general, lands acquired pursuant to this subsection are legitimate costs and their fair market value, developed according to Federal appraisal standards, may be included as match. The value of lands donated to the State and cash donations may also be used as match. If the State already owns land which is to be used in the sanctuary, the value of any use of the land foregone by the State in order to include such land in the sanctuary, capitalized over the next 20 years, may be used by the State as match. The value of lands purchased by a State within the boundaries of proposed sanctuaries while an application for a preliminary acquisition grant or land acquisition grant is being considered may also be used as match.

(b) An acquisition application should contain the following information:

(1) Description of any changes in proposed sanctuary from that presented in the preliminary acquisition grant application. If such an application has not been made, then, information equivalent to that required in such a grant application should be provided.

(2) Identification of ownership patterns, proportions of land already in the public domain; fair market value appraisal and Uniform Relocation Act plan.

(3) Description of research programs, potential and committed research organizations or agencies, and benefits to the overall coastal zone management program.

(4) Description of proposed management techniques, including the management agency and proposed budget—including both State and Federal shares.

(5) Description of planned or anticipated land and water use and controls for contiguous lands surrounding the proposed sanctuary (including, if appropriate, an analysis of the desirability of creating a marine sanctuary in adjacent areas).

(6) Assessment of the environmental, and socio-economic impacts of declaring the area an estuarine sanctuary, including the economic impact on the surrounding community and its tax base.

(7) Discussion, including cost and feasibility of alternative methods for acquisition and protection of the area.

§ 921.13 Application for operation grants.

(a) Although an acquisition grant application for creation of an estuarine sanctuary should include initial operation costs, subsequent applications may be submitted following acquisition and establishment of an estuarine sanctuary for additional operational funds. As indicated in § 921.11, these costs may include administrative costs necessary to monitor the sanctuary and to protect the integrity of the ecosystem. Extensive management programs, capital expenses, or research will not normally be funded by section 315 grants.

(b) After the creation of an estuarine sanctuary established under this program, applications (Form SF 424) for Federal assistance (non-construction program), for such operational grants should include at least the following information:

(1) Identification of the boundary (map).

(2) Specifications of the research and management programs, including managing agency and techniques.

(3) Detailed budget.

(4) Discussion of recent and projected use of the sanctuary.

(5) Perceived threats to the integrity of the sanctuary.

§ 921.14 Federally-owned lands.

(a) Where Federally-owned lands are a part of or adjacent to the area proposed for designation as an estuarine sanctuary, or where the control of land and water uses on such lands is necessary to protect the natural system within the sanctuary, the State should contact the Federal agency maintaining control of the land to request cooperation in providing coordinated management policies. Such lands and State request, and the Federal agency response, should be identified and conveyed to the Office of Coastal Zone Management.

(b) Where such proposed use or control of Federally-owned lands would not conflict with the Federal use of their lands, such cooperation and coordination is encouraged to the maximum extent feasible.

(c) Section 315 grants may not be awarded to Federally-owned lands; however, a similar status may be provided on a voluntary basis for Federally-owned lands under the provisions of the Federal Committee on Ecological Perserves program.

§ 921.20 [Amended]

(4) Subpart C—Selection Criteria—is amended by changing the first sentence in § 921.20 to read: "Applications for preliminary acquisition or land acquisition grants to establish estuarine sanctuaries will be reviewed and judged on criteria including:"

(5) Section 921.21 is revised, as follows:

§ 921.21 Public participation.

(a) Public participation in the selection of an estuarine sanctuary is required. In the selection process, the selecting entity (see § 921.10) shall seek the views of possibly affected landowners, local governments, and Federal agencies, and shall seek the views of possibly interested other parties and organizations. The latter would include, but need not be limited to, private citizens and business, social, and environmental organizations in the area of the site being considered for selection. This solicitation of views may be accomplished by whatever means the selecting entity deems appropriate, but shall include at least one public hearing in the area. Notice of such hearing shall include information as to the time, place, and subject matter, and shall be published in the principal area media. The hearing shall be held no sooner than 15 days following the publication of notice.

(b) The Office of Coastal Zone Management (OCZM) shall prepare draft and final environmental impact statements pertaining to the site finally selected for the estuarine sanctuary following public participation in the selection of that site, and shall distribute these as appropriate. OCZM may hold a public hearing in the area of such site at which both the draft environmental impact statement (DEIS) and the merits of the site selection may be addressed by those in attendance. OCZM shall hold such a hearing if: (1) In its view, the DEIS is controversial, or (2) if there appears to be a need for further informing the public with regard to either the DEIS or one or more aspects of the site selected, or (3) if such a hearing is requested in writing (to either the selecting entity or (CZM) by an affected or interested party, or (4) for other good cause. If held, such hearing shall be held no sooner than 30 days following the issuance of the DEIS and no sooner than 15 days after appropriate notice of such hearing has been given in the area by OCZM with the assistance of the selecting entity.

[FR Doc.77–26123 Filed 9–8–77;8:45 am]

necessary to the objectives of the grant project. As used herein the terms "cost" and "grant project" pertain to both the Federal grant and the matching share. The allowability of cost will be determined in accordance with the provisions of FMC 74-4: Cost Principles applicable to Grants and Contracts with State and Local Governments, and with the guidance contained in section 920 42(b)(3).

(f) The Form SF-424, Application for Federal Assistance (Non-Construction Programs), constitutes the formal application and must be submitted 60 days prior to the desired grant beginning date. The application must be accompanied by evidence of compliance with A-95 requirements including the resolution of any problems raised by the proposed project. The Associate Administrator will not accept application substantially deficient in adherence to A-95 requirements.

(g) In Part IV, Program Narrative of the Form SF-424, the applicant should repond to the following requirements:

(1) Set forth a work program describing the activities to be undertaken during the grant period. This work program shall include:

(i) A precise description of each major task to be undertaken to resolve section 306 deficiencies, and a specific timetable for remedying these deficiencies;

(ii) A precise description of implementation activities for approved management components, including a demonstration that these implementation funds will not be applied outside the approved coastal management boundaries;

(iii) A precise description of any other tasks necessary for and allowable under subsection 305(d);

(iv) For each task, identify any "Other Entities," as defined in the "Manual," that will be allocated responsibility for carrying out all or portions of the task, and indicate the estimated cost of the subcontract for each allocation. Identify, if any, that portion of the task that will be carried out under contract with consultants and indicate the estimated cost of such contract(s); and

(v) For each task, indicate the estimated total cost. Also, indicate the estimated total months of effort, if any, allocated to the task from the applicant's staff.

(2) The sum of all task costs in the above paragraph should equal the total estimated grant project cost.

(3) Using two categories, Professional and Clerical, indicate the total number of personnel in each category on the applicant's staff that will be assigned to the grant project. Also indicate the number assigned full time and the number assigned less than full time in the two categories. Additionally, indicate the number of new positions created in the two categories as a result of the grant project.

PART 921—ESTUARINE SANCTUARY GUIDELINES

Subpart A—General

Sec.

921.1 Policy and objectives.
921.2 Definitions.
921.3 Objectives and implementation of the program.
921.4 Biogeographic classification.
921.5 Multiple use.
921.6 Relationship to other provisions of the Act and to marine sanctuaries.

Subpart B—Application for Grants

921.10 General.
921.11 Application for initial acquisition, development and operation grants.
921.12 Application for subsequent development and operation grants.
921.13 Federally owned lands.
921.14 Application time schedule and procedure.

Subpart C—Selection Criteria

921.20 Criteria for selection.
921.21 Public participation.

Subpart D—Operation

921.30 General.
921.31 Changes in the sanctuary boundary, management policy or research program.
921.32 Program review.

AUTHORITY: Sec. 312, Pub. L. 92-583, as amended; 86 Stat. 1280 (16 USC 1461).

SOURCE: 39 FR 19924, June 4, 1974, unless otherwise noted.

Subpart A—General

§ 921.1 Policy and Objectives.

The estuarine sanctuaries program will provide grants to States on a matching basis to acquire, develop and operate natural areas as estuarine sanctuaries in order that scientists and students may be provided the opportunity to examine over a period of time the ecological relationships within the area. The purpose of these guidelines is to establish the rules and regulations for implementation of the program.

§ 921.2 Definitions.

(a) In addition to the definitions found in the Act and in the regulations dealing with Coastal Zone Management Program Development Grants published November 29, 1973 (Part 920 of this chapter) the term "estuarine sanctuary" as defined in the Act, means a research area which may include any part or all of an estuary, adjoining transitional areas, and adjacent uplands, constituting to the extent feasible a natural unit, set aside to provide scientists and students the opportunity to examine over a period of time the ecological relationships within the area.

(b) For the purposes of this section, "estuary" means that part of a river or stream or other body of water having unimpaired connection with the open sea where the seawater is measurably diluted with freshwater derived from land drainage. The term includes estuary-type areas of the Great Lakes as well as lagoons in more arid coastal regions.

(c) The term "multiple use" as used in this section shall mean the simultaneous utilization of an area or resource for a variety of compatible purposes or to provide more than one benefit. The term implies the long-term, continued uses of such resources in such a fashion that other uses will not interfere with, diminish or prevent the primary purpose, which is the long-term protection of the area for scientific and educational use.

§ 921.3 Objectives and implementation of the program.

(a) General. The purpose of the estuarine sanctuaries program is to create natural field laboratories in which to gather data and make studies of the natural and human processes occurring within the estuaries of the coastal zone. This shall be accomplished by the establishment of a series of estuarine sanctuaries which will be designated so that at least one representative of each type of estuarine ecosystem will endure into the future for scientific and educational purposes. The primary use of estuarine sanctuaries shall be for research and educational purposes, especially to provide some of the information essential to coastal zone management decision-making. Specific examples of such purposes and uses include but are not limited to:

(1) To gain a thorough understanding of the ecological relationships within the estuarine environment.

(2) To make baseline ecological measurements.

(3) To monitor significant or vital changes in the estuarine environment.

(4) To assess the effects of man's stresses on the ecosystem and to forecast and mitigate possible deterioration from human activities.

(5) To provide a vehicle for increasing public knowledge and awareness of the complex nature of estuarine systems, their values and benefits to man and nature, and the problems which confront them.

(b) The emphasis within the program will be on the designation as estuarine sanctuaries of areas which will serve as natural field laboratories for studies and investigations over an extended period. The area chosen as an estuarine sanctuary shall, to the extent feasible, include water and land masses constituting a natural ecological unit.

(c) In order that the estuarine sanctuary will be available for future studies, research involving the destruction of any portion of an estuarine sanctuary which would permanently alter the nature of the ecosystem shall not normally be permitted. In the unusual circumstances where permitted, ma-

nipulative field research shall be carefully controlled. No experiment which involves manipulative research shall be initiated until the termination date is specified and evidence given that the environment will be returned to its condition which existed prior to the experiment.

(d) It is anticipated that most of the areas selected as sanctuaries will be relatively undisturbed by human activities at the time of acquisition. Therefore, most of the areas selected will be areas with a minimum of development, industry or habitation.

(e) If sufficient permanence and control by the State can be assured, the acquisition of a sanctuary may involve less than the acquisition of a fee simple interest. Such interest may be, for example, the acquisition of a conservation easement, "development rights", or other partial interest sufficient to assure the protection of the natural system. Leasing, which would not assure permanent protection of the system, would not be an acceptable alternative.

§ 921.4 Biogeographic classification.

(a) It is intended that estuarine sanctuaries should not be chosen at random, but should reflect regional differentiation and a variety of ecosystems so as to cover all significant variations. To ensure adequate representation of all estuarine types reflecting regional differentiation and a variety of ecosystems, selections will be made by the Secretary from the following biogeographic classifications:

1. *Arcadian.* Northeast Atlantic coast south to Cape Cod, glaciated shoreline subject to winter icing; well developed algal flora; boreal biota.

2. *Virginian.* Middle Atlantic coast from Cape Cod to Cape Hatteras; lowland streams, coastal marshes and muddy bottoms; characteristics transitional between 1 and 3; biota primarily temperate with some boreal representatives.

3. *Carolinian.* South Atlantic coast, from Cape Hatteras to Cape Kennedy; extensive marshes and swamps; waters turbid and productive; biota temperate with seasonal tropical elements.

4. *West Indian.* South Florida coast from Cape Kennedy to Cedar Key; and Caribbean Islands; shoreland low-lying limestone; calcareous sands, marls and coral reefs; coastal marshes and mangroves; tropical biota.

5. *Louisianian.* Northern Gulf of Mexico, from Cedar Key to Mexico; characteristics of 3, with components of 4; strongly influenced by terrigenous factors; biota primarily temperate.

6. *Californian.* South Pacific coast from Mexico to Cape Mendocino; shoreland influenced by coastal mountains; rocky coasts with reduced fresh-water runoff; general absence of marshes and swamps; biota temperate.

7. *Columbian.* North Pacific coast from Cape Mendocino to Canada; mountainous shoreland; rocky coasts; extensive algal communities; biota primarily temperate with some boreal.

8. *Fiords.* South coast Alaska and Aleutians; precipitous mountains; deep estuaries, some with glaciers; shoreline heavily indented and subject to winter icing; biota boreal to sub-Arctic.

9. *Subarctic.* West and north coasts of Alaska; ice stressed coasts; biota Arctic and sub-Arctic.

10. *Insular.* Larger islands, sometimes with precipitous mountains; considerable wave action; frequently with endemic species; larger island groups primarily with tropical biota.

11. *Great Lakes.* Great Lakes of North America; bluff-dune or rocky, glaciated shoreline; limited wetlands; freshwater only; biota a mixture of boreal and temperate species with anadromous species and some marine invaders.

(b) Various sub-categories will be developed and utilized as appropriate.

§ 921.5 Multiple use.

(a) While the primary purpose of estuarine sanctuaries is to provide long-term protection for natural areas so that they may be used for scientific and educational purposes, multiple use of estuarine sanctuaries will be encouraged to the extent that such use is compatible with this primary sanctuary purpose. The capacity of a given sanctuary to accommodate additional uses, and the kinds and intensity of such use, will be determined on a case by case basis. While it is anticipated that compatible uses may generally include activities such as low intensity recreation, fishing, hunting, and wildlife observation, it is recognized that the exclusive use of an area for scientific or educational purposes may provide the optimum benefit to coastal zone management and resource use and may on occasion be necessary.

(b) There shall be no effort to balance or optimize uses of an estuarine sanctuary on economic or other bases. All additional uses of the sanctuary are clearly secondary to the primary purpose and uses, which are long-term maintenance of the ecosystem for scientific and educational uses. Non-compatible uses, including those uses which would cause significant short or long-term ecological change or would otherwise detract from or restrict the use of the sanctuary as a natural field laboratory, will be prohibited.

§ 921.6 Relationship to other provisions of the act and to marine sanctuaries.

(a) The estuarine sanctuary program must interact with the overall coastal zone management program in two ways: (1) the intended research use of the sanctuary should provide relevant data and conclusions of assistance to coastal zone management decision-making, and (2) when developed, the State's coastal zone management program must recognize and be designed to protect the estuarine sanctuary; appropriate land and water use regulations and planning considerations must apply to adjacent lands. Although estuarine sanctuaries should be incorporated into the State coastal zone management program, their designation need not await the development and approval of the management program where operation of the estuarine sanctuary would aid in the development of a program.

(b) The estuarine sanctuaries program will be conducted in close cooperation with the marine sanctuaries program (Title III of the Marine Protection, Research Act of 1972, Pub. L. 92-532, which is also administered by the Office of Coastal Zone Management, NOAA), which recognizes that certain areas of the ocean waters, as far seaward as the outer edge of the Continental Shelf, or other coastal waters where the tide ebbs and flows, or of the Great Lakes and their connecting waters, need to be preserved or restored for their conservation, recreational, ecologic or esthetic values. It is anticipated that the Secretary on occasion may establish marine sanctuaries to complement the designation by States of estuarine sanctuaries, where this may be mutually beneficial.

Subpart B—Application for Grants

§ 921.10 General.

Section 312 authorizes Federal grants to coastal States so that the States may establish sanctuaries according to regulations promulgated by the Secretary. Coastal States may file applications for grants with the Director, Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Rockville, Maryland 20852. That agency which has been certified to the Office of Coastal Zone Management as the entity responsible for administration of the State coastal zone management program may either submit an application directly, or must endorse and approve applications submitted by other agencies within the State.

§ 921.11 Application for initial acquisition, development and operation grants.

(a) Grants may be awarded on a matching basis to cover the costs of acquisition, development and operation of estuarine sanctuaries. States may use donations of land or money to satisfy all or part of the matching cost requirements.

(b) In general, lands acquired pursuant to this section, including State owned lands but not State owned submerged lands or bay bottoms, that occur within the proposed sanctuary boundary are legitimate costs and their fair market value may be included as match. However, the value of lands donated to or by the State for inclusion in the sanctuary may only be used to match other costs of land acquisition. In the event that lands already exist in a protected status, their value cannot be used as match for sanctuary development and operation grants, which will require their own matching funds.

(c) Development and operation costs may include the administrative expenses necessary to monitor the sanctuary, to ensure its continued viability

and to protect the integrity of the ecosystem. Research will not normally be funded by Section 312 grants. It is anticipated that other sources of Federal, State and private funds will be available for research in estuarine sanctuaries.

(d) Initial applications should contain the following information:

(1) Description of the proposed sanctuary include location, boundaries, size and cost of acquisition, operation and development. A map should be included, as well as an aerial photograph, if available.

(2) Classification of the proposed sanctuary according to the biogeographic scheme set forth in § 921.4.

(3) Description of the major physical, geographic and biological characteristics and resources of the proposed sanctuary.

(4) Identification of ownership patterns; proportion of land already in the public domain.

(5) Description of intended research uses, potential research organizations or agencies and benefits to the overall coastal zone management program.

(6) Demonstration of necessary authority to acquire or control and manage the sanctuary.

(7) Description of proposed management techniques, including the management agency, principles and proposed budget including both State and Federal shares.

(8) Description of existing and potential uses of and conflicts within the area if it were not declared an estuarine sanctuary; potential use, use restrictions and conflicts if the sanctuary is established.

(i) Assessment of the environmental and socio-economic impacts of declaring the area an estuarine sanctuary, including the economic impact of such a designation on the surrounding community and its tax base.

(9) Description of planned or anticipated land and water use and controls for contiguous lands surrounding the proposed sanctuary (including if appropriate an analysis of the desirability of creating a marine sanctuary in adjacent areas).

(10) List of protected sites, either within the estuarine sanctuaries program or within other Federal, State or private programs, which are located in the same regional or biogeographic classification.

(i) It is essential that the opportunity be provided for public involvement and input in the development of the sanctuary proposal and application. Where the application is controversial or where controversial issues are addressed, the State should provide adequate means to ensure that all interested parties have the opportunity to present their views. This may be in the form of an adequately advertised public hearing.

(ii) During the development of an estuarine sanctuary application, all landowners within the proposed boundaries should be informed in writing of the proposed grant application.

(iii) The application should indicate the manner in which the State solicited the views of all interested parties prior to the actual submission of the application.

(e) In order to develop a truly representative scheme of estuarine sanctuaries, the States should attempt to coordinate their activities. This will help to minimize the possibility of similar estuarine types being proposed for designation in the same region. The application should indicate the extent to which neighboring States were consulted.

(f) Discussion, including cost and feasibility, of alternative methods for acquisition, control and protection of the area to provide similar uses. Use of the marine sanctuary authority and funds from the Land and Water Conservation Fund Act should be specifically addressed.

§ 921.12 Application for subsequent development and operation grants.

(a) Although the initial grant application for creation of an estuarine sanctuary should include initial development and operation costs, subsequent applications may be submitted following acquisition and establishment of an estuarine sanctuary for additional development and operation funds. As indicated in § 921.11, these costs may include administrative costs necessary to monitor the sanctuary and to protect the integrity of the ecosystem. Extensive management programs, capital expenses, or research will not normally be funded by section 312 grants.

(b) After the creation of an estuarine sanctuary established under this program, applications for such development and operation grants should include at least the following information:

(1) Identification of the boundary.

(2) Specifications of the management program, including managing agency and techniques.

(3) Detailed budget.

(4) Discussion of recent and projected use of the sanctuary.

(5) Perceived threats to the integrity of the sanctuary.

§ 921.13 Federally owned lands.

(a) Where federally owned lands are a part of or adjacent to the area proposed for designation as an estuarine sanctuary, or where the control of land and water uses on such lands is necessary to protect the natural system within the sanctuary, the State should contact the Federal agency maintaining control of the land to request cooperation in providing coordinated management policies. Such lands and State request, and the Federal agency response, should be identified and conveyed to the Office of Coastal Zone Management.

(b) Where such proposed use or control of federally owned lands would not conflict with the Federal use of their lands, such cooperation and coordination is encouraged to the maximum extent feasible.

(c) Section 312 grants may not be awarded to federal agencies for creation of estuarine sanctuaries in Federally owned lands; however, a similar status may be provided on a voluntary basis for Federally owned lands under the provisions of the Federal Committee on Ecological Preserves program.

§ 921.14 Application time schedule and procedure.

(a) Effective January 1, 1975, the review and selection of estuarine sanctuary applications will be conducted on a twice yearly basis. All applications received between January 1 and June 30 of any year will be considered together beginning July 1 of that year; applications received between July 1 and December 31 will be considered together beginning January 1 of the following year.

(b) All applications received during any application period will be subject to simultaneous review and consideration. At the end of each application period, a suitable number of applications, based on the level of funding available, will be selected for further review and processing. Unless sufficiently distinguished as major subcategories, no more than one application from each biogeographic category will be selected for final processing during each review period. Normally, the applications selected will be processed and the grants awarded within 6 months from the end of the application period, that is before the next review period begins. Applications which are not selected for processing may be resubmitted for consideration during the next review period.

(c) At least ninety (90) days prior to submission of an application under this section, an applicant state must notify in writing the OCZM, appropriate state and regional A-95 clearinghouses, and other states within the same biogeographic category (see Table 1) of its intention to file an application for an estuarine sanctuary grant. Such notification should include at least the identification of the state agency applying for the grant; the geographic location of the proposed sanctuary and its boundaries; proposed objectives of the sanctuary, including intended research uses; estimated cost of sanctuary; and estimated date for submission of application. Copies of the A-95 notifications to the state and regional clearinghouse would be considered sufficient and desirable notification to OCZM and to the other states.

TABLE 1—LIST OF STATES BY BIOGEOGRAPHIC CLASSIFICATION

1. Acadian—Maine, New Hampshire, Massachusetts.

2. Virginian—Massachusetts, Rhode Island, Connecticut, New York, New Jersey.

Delaware, Maryland, Virginia, North Carolina.

3. Carolinian—North Carolina, South Carolina, Georgia, Florida.

4. West Indian—Florida, Puerto Rico, Virgin Islands.

5. Louisianian—Florida, Mississippi, Alabama.

6. Californian—California.

7. Columbian—California, Oregon, Washington.

8. Fiord—Alaska.

9. Sub-Arctic—Alaska.

10. Insular—Hawaii, Guam, American Samoa.

11. Great Lakes—Minnesota, Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, New York.

(d) The Director of OCZM may, upon the finding of extenuating circumstances relating to applications for assistance, waive appropriate administrative requirements contained herein.

[39 FR 45214, Dec. 31, 1974]

Subpart C—Selection Criteria

§ 921.20 Criteria for selection.

Applications for grants to establish estuarine sanctuaries will be reviewed and judged on criteria including:

(a) Benefit to the coastal zone management program. Applications should demonstrate the benefit of the proposal to the development or operations of the overall coastal zone management program, including how well the proposal fits into the national program of representative estuarine types; the national or regional benefits; and the usefulness in research.

(b) The ecological characteristics of the ecosystem, including its biological productivity, diversity and representativeness. Extent of alteration of the natural system, its ability to remain a viable and healthy system in view of the present and possible development of external stresses.

(c) Size and choice of boundaries. To the extent feasible, estuarine sanctuaries should approximate a natural ecological unit. The minimal acceptable size will vary greatly and will depend on the nature of the ecosystem.

(d) Cost. Although the Act limits the Federal share of the cost for each sanctuary to $2,000,000, it is anticipated that in practice the average grant will be substantially less than this.

(e) Enhancement of non-competitive uses.

(f) Proximity and access to existing research facilities.

(g) Availability of suitable alternative sites already protected which might be capable of providing the same use or benefit. Unnecessary duplication of existing activities under other programs should be avoided. However, estuarine sanctuaries might be established adjacent to existing preserved lands where mutual enhancement or benefit of each might occur.

(h) Conflict with existing or potential competing uses.

(i) Compatibility with existing or proposed land and water use in contiguous areas.

If the initial review demonstrates the feasibility of the application, an environmental impact statement will be prepared by the Office of Coastal Zone Management in accordance with the National Environmental Policy Act of 1969 and implementing CEQ guidelines.

§ 921.21 Public participation.

Public participation will be an essential factor in the selection of estuarine sanctuaries. In addition to the participation during the application development process (§ 921.11(e)), public participation will be ensured at the Federal level by the NEPA process and by public hearings where desirable subsequent to NEPA. Such public hearings shall be held by the Office of Coastal Zone Management in the area to be affected by the proposed sanctuary no sooner than 30 days after it issues a draft environmental impact statement on the sanctuary proposal. It will be the responsibility of the Office of Coastal Zone Management, with the assistance of the applicant State, to issue adequate public notice of its intention to hold a public hearing. Such public notice shall be distributed widely, especially in the area of the proposed sanctuary; affected property owners and those agencies, organizations or individuals with an identified interest in the area or estuarine sanctuary program shall be notified of the public hearing. The public notice shall contain the name, address and phone number of the appropriate Federal and State officials to contact for additional information about the proposal.

Subpart D—Operation

§ 921.30 General.

Management of estuarine sanctuaries shall be the responsibility of the applicant State or its agent. However, the research uses and management program must be in conformance with these guidelines and regulations, and others implemented by the provisions of individual grants. It is suggested that prior to the grant award, representatives of the proposed sanctuary management team and the Office of Coastal Zone Management meet to discuss management policy and standards. It is anticipated that the grant provisions will vary with individual circumstances and will be mutually agreed to by the applicant and the granting agency. As a minimum, the grant document for each sanctuary shall:

(a) Define the intended research purposes of the estuarine sanctuary.

(b) Define permitted, compatible, restricted and prohibited uses of the sanctuary.

(c) Include a provision for monitoring the uses of the sanctuary, to ensure compliance with the intended uses.

(d) Ensure ready access to land use of the sanctuary by scientists, students and the general public as desirable and permissible for coordinated research and education uses, as well as for other compatible purposes.

(e) Ensure public availability and reasonable distribution of research results for timely use in the development of coastal zone management programs.

(f) Provide a basis for annual review of the status of the sanctuary, its value to the coastal zone program.

(g) Specify how the integrity of the system which the sanctuary represents will be maintained.

(h) Provide adequate authority and intent to enforce management policy and use restrictions.

§ 921.31 Changes in the sanctuary boundary, management policy or research program.

(a) The approved sanctuary boundaries; management policy, including permissible and prohibited uses; and research program may only be changed after public notice and the opportunity of public review and participation such as outlined in § 921.21.

(b) Individuals or organizations which are concerned about possible improper use or restriction of use of estuarine sanctuaries may petition the State management agency and the Office of Coastal Zone Management directly for review of the management program.

§ 921.32 Program review.

It is anticipated that reports will be required from the applicant State on a regular basis, no more frequently than annually, on the status of each estuarine sanctuary. The estuarine sanctuary program will be regularly reviewed to ensure that the objectives of the program are being met and that the program itself is scientifically sound. The key to the success of the estuarine sanctuaries program is to assure that the results of the studies and research conducted in these sanctuaries are available in a timely fashion so that the States can develop and administer land and water use programs for the coastal zone. Accordingly, all information and reports, including annual reports, relating to estuarine sanctuaries shall be part of the public record and available at all times for inspection by the public.

PART 922—MARINE SANCTUARIES

Subpart A—General

Sec.

922.1 Policy and objectives.
922.2 Programmatic objectives.

APPENDIX 2

ESTUARINE SANCTUARY SELECTION COMMITTEE MEMBERSHIP LIST

NAME	AGENCY
Earl Bradley	Coastal Resources Division/Department of Natural Resources, Tidewater Administration
Paul Breidenbaugh	Maryland Wildlife Federation
Carlo Brunori	Maryland Wildlife Administration
Harold Cassell	Water Resources Administration
R. R. Colwell	Sea Grant
Joseph Cooney	Chesapeake Biological Laboratory, University of Maryland
L. Eugene Cronin	Chesapeake Research Consortium
Betty Dickenson	Wye Institute
George Fenwick	The Nature Conservancy
Ronald Gatton	National Marine Fisheries Service/NOAA
Elder Ghigiarelli	Coastal Resources Division/DNR
W. P. Jensen	Tidewater Administration - Tidal Fisheries
Judy Johnson	Committee to Preserve Assateague
Jim Kerwin	Bureau of Land Management, Dept. of the Interior
Malcolm King	Izaak Walton League
David Miller	Maryland Environmental Trust
Suzanne Nair	U. S. Fish & Wildlife Service, Dept. of the Interior
Jody Roesler	Maryland Environmental Trust
J. Kevin Sullivan	Chesapeake Bay Center for Environmental Studies Smithsonian Institution
Dennis Taylor	University of Maryland
John Williams	Coastal Resources Division/DNR

APPENDIX 3

MARYLAND'S NATIONAL ESTUARINE SANCTUARY PROGRAM

SITE SELECTION PROCESS

1980

Prepared By

John B. Williams

Coastal Resources Division

Department of Natural Resources
Tawes State Office Building
Annapolis, Maryland

I. Introduction:

National Estuarine Sanctuaries Program

Estuaries can be generally described as coastal water bodies where freshwater river flows from the land meet the pulsing tidal flows of the saltier ocean water. These two current flows produce a body of water which is a variable saline mixture of the river and ocean water and has a rich supply of nutrients essiential for plant growth. The low lying coastal topography and shallow near-shore waters also support extensive marsh areas which contribute food material to the productive food webs found in estuaries.

The high productivity of estuaries is well documented and some estimates indicate that more than two thirds of the commercial and recreational fish landings caught in the United States are directly dependent upon estuaries. For most shellfish species this fraction would be higher. However, competing human uses of estuarine waters and shorelines and their associated tributaries are having negative impacts on these productive ecosystems. In order to properly manage man's activities in the estuary, a thorough understanding of the natural processes operating there must exist. This type of information can then be used to promote wise use of these limited natural resources. The National Estuarine Sanctuary Program, established through the Federal Coastal Zone Management Act of 1972, was designed to assist states in developing this better understanding of how estuaries function. (This program is described in Appendix I.)

This Program provides 50 percent matching grants to coastal states to acquire, develop, or operate estuarine areas to be set aside "to serve as natural field laboratories in which to study and gather data on the natural and human processes occurring within the estuaries of the coastal zone." These sanctuary areas will be mainly used for educational and research purposes and can serve as control areas to determine the effects of development on other estuaries. While these sanctuaries will be protected from adverse human impacts such as dam construction, it is expected that other activities such as hunting and fishing could continue

since they are a "natural" activity in most estuaries. These sanctuaries will provide students and the general public with places where they can learn about the estuarine environment and its ecology in a natural setting.

Importance of Estuaries to Maryland

The State of Maryland is greatly committed to maintaining the productivity of its extensive estuarine areas. This takes on national significance when one considers that most of this estuarine area is contained in Chesapeake Bay, the nation's largest estuary. Watermen and other local citizens are dependent upon a productive estuary as well as citizens in other East Coast states who harvest fish such as striped bass which either spawn or grow up in Chesapeake Bay. In order to effectively manage this large ecosystem, a proper understanding of estuarine ecology is essential. For this reason designation of an estuarine sanctuary in Maryland would provide a valuable tool for enhancing management of Chesapeake Bay and other estuarine areas. (Due to the wide range of estuarine zones in Chesapeake Bay it would be best to eventually develop a series of sanctuary sites representative of each zone.)

Previous Maryland Sanctuary Efforts

Maryland's activities under the National Estuarine Sanctuaries Program (NESP) actually began in 1974. This included extensive evaluations of potential sites through field visits and analyses of aerial photographs. A full description of these earlier site evaluations and selections is contained in Appendix II, prepared by Elder Ghigiarelli of the Coastal Resources Division (CRD).

The primary site selected in 1975 by a steering committee composed of representatives from different State and Federal agencies, research institutions and environmental groups was World's End Creek located in Dorchester County. Difficulties in property acquisition were encountered with this site and later sanctuary designation activities were discontinued.

A clarification of NOAA's policies towards sanctuary uses was presented to Maryland Coastal Resources Division in early 1980. It was presented that NOAA was shifting some emphasis away from tight control of activities within a sanctuary site and becoming more positive towards the research, educational, and other compatible uses that could be conducted within a sanctuary. This clarification of policy caused CRD to renew its NESP activities and reactivate its Steering Committee.

1980 Estuarine Sanctuary Steering Committee

The present NESP Steering Committee (SC) consists of the former 1975 committee (with new names where staff changes have occurred) plus new representatives from different organizations within the State Coastal Resources Advisory Committee (CRAC). SC membership was opened to any CRAC member who wished to participate. (A partial list of SC members and meeting attendees is contained in Appendix III).

II. Selection Process

Evaluation Criteria and Site Selection Process

After preliminary discussions with Federal OCZM Sanctuaries Program staff, CRD began efforts to reactivate its 1975 Steering Committee along with related CRAC representatives and Maryland research institutions. Notification of the first meeting on May 29, 1980 was sent out on May 14, 1980. This correspondence along with all others transmitted to the SC are included in Appendix III.

The purpose of the May 29 meeting was to develop criteria for selecting suitable sanctuary sites and to reconsider the list of sites developed in 1975 to determine whether additions or deletions should be made. Criteria developed for the earlier NESP efforts were critically discussed and revised to produce the following eight (8) criteria:

Criteria for Site Evaluation

1) Presence of a complete system - estuary, wetlands, and uplands

    a) Presence of a tributary on the site. Is tributary entirely within site boundaries?

b) Wetland area comprises a significant precentage of of the site area.

(c) Presence of a salinity gradient along the estuarine portion of the site.

2) Relative lack of disturbance on the site and/or compatible land/water use within the watershed.

3) Suitablity of the site for educational and estuarine research activities.

4) Representative of larger portions of Maryland's Chesapeake Bay estuarine system.

5) Presence of endangered species within site.

6) Proximity of site to other State or Federal protected natural areas.

7) Diversity of habitats within site boundaries.

8) Ease of acquisition.

Two main concerns controlling this preliminary review of sites (listed in Appendix II, page 26) were (1) whether or not significant degradation was known to have occurred at a site since 1975 and (2) would acquisition of land parcels be too slow a process to meet a September 15, 1980 deadline for site selection established by OCZM. Due to the second concern, about the deadline, some suitable sites were set aside for future consideration under a potential Chesapeake Bay sanctuary system.

The results of the May 29 meeting included agreement upon the eight criteria listed previously and a reduction in the list of sites for evaluation to eight sites.

Parker Creek - Calvert County

Horn Point - Dorchester County

World's End Creek - Dorchester County

Little Monie Creek - Somerset County

Zekiah Swamp - Charles County

Nanjemoy Creek - Charles County

Warehouse Creek - Queen Anne's County

Rhode River - Anne Arundel County

It was later requested in a June 9, 1980 letter (Appendix III) that SC members weight the criteria on a 100 point basis and submit any information for the eight sites to CRD by June 23, 1980.

Site evaluation information for each of the eight sites was then compiled by CRD staff and sent out to SC members to be evaluated according to the eight criteria for discussion at the next SC meeting on July 18, 1980. Weights for each of the criteria were determined from the mean values of the points awarded by SC members.

At the July 18 meeting the SC numerically compiled their individual rankings of the sites, according to the criteria, using the work sheets in Appendix IV. This numerical ranking was designed to only serve as a basis for discussion in determining a final ranking of sites after reviewing practical considerations. The numerical rankings produced the following results:

Rank	Site	Points
1	World's End Creek	788
2	Rhode River-Smithsonian	744
3	Parker Creek	676
4	Zekiah Swamp	661
5	Little Monie Creek	656
6	Nanjemoy Creek	632
7	Warehouse Creek	578
8	Horn Point	540

Horn Point was eliminated from further consideration after Dr. Dennis Taylor's recommendation to that effect. (A Coast Guard facility is planned for the site). Among the remaining seven sites, the SC decided to rerank all sites but World's End Creek and Rhode River because they felt these two sites were appropriately ranked. (The remaining sites had smaller ranges between their

scores). After discussion the final rankings of sites were:

Rank	Site
1	World's End Creek
2	Rhode River
3	Little Monie Creek
4	Parker Creek
5	Zekiah Swamp
6	Nanjemoy Creek

Warehouse Creek was eliminated from further consideration.

It was recommended to CRD by the Steering Committee that the top four sites be pursued simultaneously in the site acquisition process since one site might not be able to be acquired and emphasis could be shifted to an alternative site without time being lost. It was further agreed that Maryland Environmental Trust should contact affected property owners to determine their interest in the NESP. CRD was to organize meetings with the appropriate State legislative delegations and OCZM officials to discuss the potential effects of the NESP on their districts. County officials were to be informed of NESP activities through CRD's Intergovernmental Coordination Program and its county coastal planners.

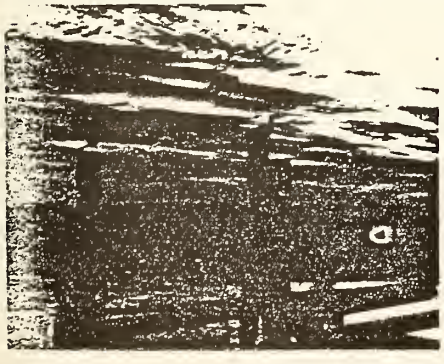
Based upon the response of property owners, a final single site would be selected by the SC at a meeting in early September 1980.

The final sites selected at the SC meeting in September 1980 for nomination to OCZM as candidate sanctuary sites were Rhode River and Little Creek/Monie Bay. The name recommended for the sanctuary will reflect the desire to develop a system of sites in Chesapeake Bay. The preferred name was Chesapeake Bay Estuarine Sanctuary at _____, with the name of a particular site inserted in the blank, e.g. Chesapeake Bay Estuarine Sanctuary at Rhode River.

national estuarine sanctuary program

National Estuarine Sanctuary Program

In sheltered areas where rivers, streams, or other bodies of fresh water meet the open seas, living creatures flourish. The diluted salt water they thrive in is constantly stirred by the tides, causing the land's waterborne humus, topsoil, and other necessities for life to mix with the ocean's minerals and organic products of underwater decay. The resulting broth is perfect for protozoa, which are eaten by plankton, which, in turn, are eaten by very young and/or small fish, and so on up the scale to shrimp, oysters, flounder, lobsters, and, of course, man. Ecologists have found that many of these natural areas provide man with more food per acre than the best Midwestern farmland (in addition to providing, at no expense to the taxpayer, such services as wastewater treatment and storm protection). Also, it has been estimated that more than two-thirds of the commercial and recreational fish caught and eaten by Americans today directly depend on these areas, which are known as estuaries.



But there is a problem with this lifegiving process: nearly all of our estuaries are being destroyed, damaged, or reduced in size through development and pollution. These prime food sources and beautiful natural areas are in danger.

In the late 1960's, two Federal studies depicting this unfortunate situation convinced Congress that something must be done for our estuaries. The result is the National Estuarine Sanctuary Program, established through the Coastal Zone Management Act of 1972 (and amended in 1976). This program was designed to make 50 percent matching grants to coastal States for the purposes of acquiring, developing, or operating estuarine areas to be set aside "to serve as natural field laboratories in which to study and gather data on the natural and human processes occurring within the estuaries of the coastal zone." The data gathered at these sanctuaries will be useful in management decisions concerning the coasts.

At least 20 estuaries are planned to be preserved in perpetuity for education and research, and they will be chosen in such a manner that they represent all of the Nation's biological and geographic regions, including the Great Lakes. (For the purposes of the Estuarine Sanctuary Program, the term *estuaries* is defined to include "estuary-type" areas of the Great Lakes.) In this way, the information obtained within these sanctuaries should be useful in making decisions concerning the welfare not only of all the Nation's estuaries, but of the entire coastal zone as well.

Sanctuary Utilization

The estuaries will be kept as undisturbed as possible so that scientists will be able to study the naturally functioning system and also will be able to use the areas as controls against which to measure ecological changes in other estuaries. In addition, the sanctuaries will provide students and the general public with places where they can learn about the ecology and the environment in a natural setting. A further benefit of these sanctuaries is the protection of vital habitats for estuarine-dependent plant and animal life, including endangered species. Also, multiple uses can take place in the sanctuaries as long as the activities do not detract from their research and educational uses.

Estuarine Sanctuaries Grants

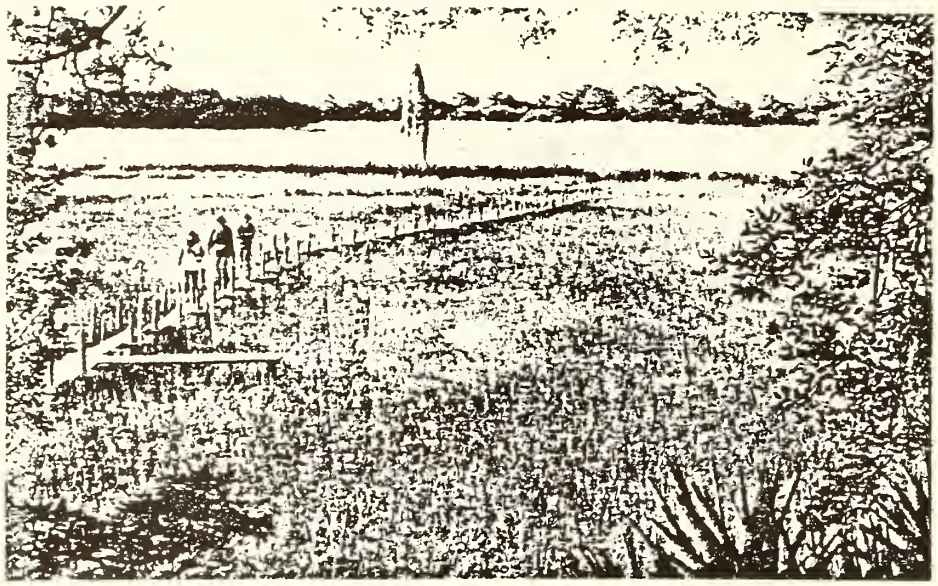
The sanctuaries are owned and managed by the individual States, but the States are financially assisted (through 50 percent matching funds) by the Federal Government in three ways: preacquisition, acquisition, and operations grants. The preacquisition grant may be used for real estate appraisals, refinement of boundaries, and for the development of management plans or programs for research and education. The acquisition grant is to cover the actual and related costs of land acquisition. Finally, operations grants are for those costs necessary for monitoring the sanctuary and protecting the health of its ecosystem, and for the establishment and maintenance of an educational and scientific program.

The Individual Sanctuaries

At present, there are seven sanctuaries in operation and several in the planning stages for funding in the not-too-distant future. Each of the sanctuaries is biologically and geographically unique, so that the benefits of each one will accrue both to the region in which it is located and to the Nation as a whole.

SOUTH SLOUGH, OREGON

The first estuarine sanctuary funded under the program is South Slough, within Coos Bay, Oregon. Truly enabling researchers to study both "natural and human processes," this 4,200-acre sanctuary preserves freshwater and saltwater marshes, an island covered with a climax forest, numerous species of



plants and animals, and in addition, a prehistoric Indian midden, an abandoned gold mine, and the sites of old railroad logging dumps. This timber country sanctuary is managed by the South Slough Estuarine Sanctuary Management Commission, which is comprised of several State agencies, local agencies, private sector representation, and a member of the Oregon University system. Because South Slough is one of the first large natural areas to be preserved in this manner, its multidisciplinary management commission may become a prototype for the planners and managers of other ecosystems to be protected in the future.

SAPELO ISLAND, GEORGIA

The concept of a "wetlands research park" truly became a reality in the unspoiled marshes and beach stretches of Sapelo Island, Georgia. Here, for more than 20 years, scientists have been pursuing a variety of studies in the biological sciences on the island's isolated wetlands environment. This research has been based at the University of Georgia Marine Institute, on the island's southern end, within the sanctuary. The sanctuary itself preserves 7,400 acres of Sapelo Island, encompassing the Duplin River. But the whole island, in addition to two adjacent islands, is preserved by various State and Federal agencies. Sapelo is the site of prehistoric Indian mounds, an oyster shell ring, and numerous plantation ruins from the late 18th and early 19th century. The only privately held property on the island, within a community called Hog Hammock, belongs to approximately 200 black people whose families have lived and worked on the island since the early eighteen hundreds.

WAIMANU, HAWAII

Waimanu, Hawaii, a mountain-enclosed stream valley, is so isolated that land access is gained only by a strenuous 6- to 8-hour hike. Because of this isolation, this 5,900-acre estuarine sanctuary is nearly pristine. Adjacent to Waimanu, however, is a nearly identical valley, Waipio, which has within it a few small taro (poi) farms. Because one is inhabited and the other is not, these two estuaries could, in the future, provide a "natural experiment" to examine the effects of farming and habitation on the estuarine ecology in comparison with an undisturbed system. Waimanu was recently featured in *America's Majestic Canyons,* published by the National Geographic Society.

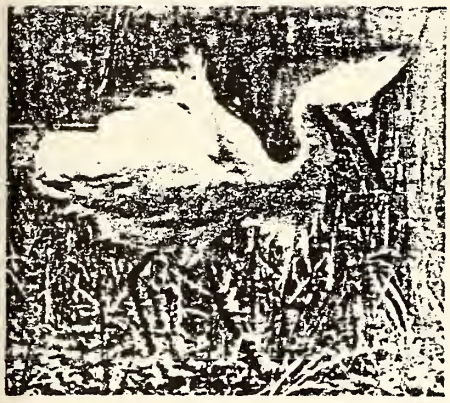
OLD WOMAN CREEK, OHIO

Old Woman Creek, Ohio, is relatively small—only 637 acres—but ecologically it is extremely valuable. The sanctuary area is one of the few comparatively natural estuaries remaining on the heavily populated shores of Lake Erie. As such, it is of great importance as a control, or baseline area, for measuring the success of coastal land and water management efforts for the Great Lakes biogeographic region. Ohio is currently exploring the use of Old Woman Creek Estuarine Sanctuary as the State's freshwater research center. Since it is near urban centers, the educational aspects of estuaries also will be heavily emphasized.

ROOKERY BAY, FLORIDA

Covering more than 8,500 acres, Florida's Rookery Bay sanctuary preserves a large, mangrove filled bay and two creeks, along with their drainage corridors, from Florida's ever expanding land development. Management of the sanctuary is by the Florida Department of Fish and Game, the Collier County Conservancy, and the National Audubon Society. This unique management structure was created when the two private organizations granted a dollar-per-year, 99-year lease of the land to the State. Federal and State funds will add additional key acreage to the existing core area. The diversity of the area's fauna can be recognized by the porpoises that feed there and the bald eagles and white-tailed deer that make Rookery Bay their permanent residences. Within the sanctuary is the Rookery Bay Marine Laboratory, which, even before the sanctuary's establishment, provided data used in important coastal management decisions—a primary objective of Congress in

legislating the existence of the National Estuarine Sanctuary Program.



APALACHICOLA BAY/RIVER, FLORIDA

The largest sanctuary, at more than 190,000 acres, Florida's Apalachicola Bay/River estuary has been called one of the largest remaining naturally functioning systems in the Nation, and it is also the first sanctuary on the mouth of a major navigable river. Because of this, its establishment served to promote improved cooperation among the States of Florida, Alabama, and Georgia over river navigation. The major business activity of the town of Apalachicola, adjacent to the sanctuary, centers around the oyster industry, and it is expected that the sanctuary will benefit this and other fishing industries by protecting the environment and by providing research information that will help assure the continued productivity of this river/bay ecosystem. Within the Apalachicola Estuarine Sanctuary boundaries are an existing U.S. Fish and Wildlife Refuge and a State Park, which, together, represent a unique cooperative effort at ecosystem protection.

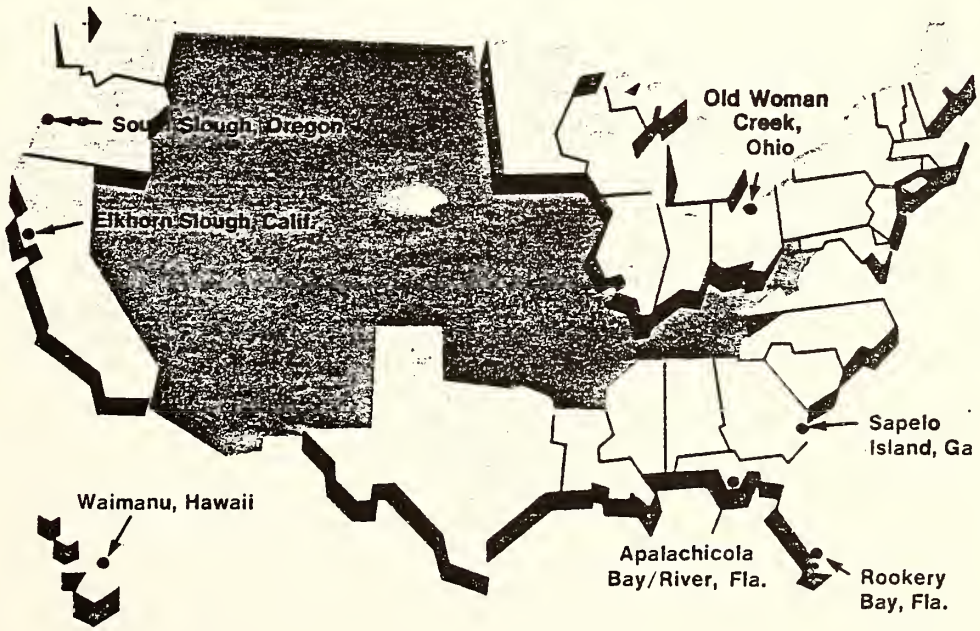
ELKHORN, SLOUGH, CALIFORNIA

One of the more recent estuarine sanctuaries to be funded is Elkhorn Slough, California. The sanctuary itself, which is on the south and east portions of the slough, covers 1,510 acres, but these will be contiguous with a proposed U.S. Fish and Wildlife Service Refuge on the north and west portions so that the whole slough system will be protected. In the future, joint management practices for both areas will be pursued by the State and the U.S. Fish and Wildlife Service. The small town of Moss Landing, at the mouth of the slough, contains within it Moss Landing Marine Laboratory, which has been and will continue doing research on the slough. Because, in general, the salt concentration of Elkhorn is close to marine, one researcher has called it "a portion of the ocean bottom conveniently located for study."

Study here, and at the other estuarine sanctuaries, will help to better understand coastal areas, so that they may remain functioning ecosystems while humans continue to enjoy their many benefits.

For more information concerning the individual sanctuaries or the National Estuarine Sanctuary Program in general, contact the appropriate State coastal zone management agency or the Federal Office of Coastal Zone Management, Estuarine Sanctuaries Program Manager, 3300 Whitehaven Street, N.W.
Washington, D.C. 20235
Phone: (202) 634-4236

ESTUARINE SANCTUARIES



Appendix 3(b)

Estuarine Sanctuary Selection Process

September, 1975

Elder Ghigiarelli

Coastal Resources Division

PREFACE

This document identifies the Estuarine Sanctuary selection process and the areas within Maryland's coastal zone to which the process was applied to select an area for proposal to the Office of Coastal Zone Management (NOAA) as an estuarine sanctuary defined under Section 312 of the Federal Coastal Zone Management Act of 1972 (Pub. L. 92-583, 86 Stat. 1280) and Estuarine Sanctuary Guidelines issued pursuant to the Coastal Zone Management Act. Thus, it is the first of several "chapters" of what will be the Department's application for an estuarine sanctuary grant. Other components of the application will include a description of the proposed sanctuary, an assessment of the environmental and socio-economic impacts of the proposed sanctuary, and a description of management techniques including intended research and educational uses.

Applying the process identified herein, and with the advice of an ad hoc site selection group, the Coastal Zone Management staff has recommended that World's End Creek be proposed to NOAA for an estuarine sanctuary grant.

I. BACKGROUND

The Coastal Zone Management Act of 1972 provides fifty percent Federal Matching grants to acquire, develop, and operate natural areas as estuarine sanctuaries for the purpose of creating natural field laboratories to gather data and make studies of the natural and human processes occurring within the estuaries of the coastal zone. From discussions with research scientists, representatives of citizen organizations, and other knowledgable people, it was decided that Maryland's approach to the estuarine sanctuary program would be to establish a string of areas throughout Maryland's coastal zone. The rationale for this approach was that it would be representative of the different types of estuarine systems which occur in the State.

To differentiate various estuarine types, combinations of wetland type and physiographic type were used. The U.S. Wetland Classification System[1] was used as the basis for distinguishing wetland types since this scheme was utilized in the only complete Statewide wetlands survey. This classification system identifies 20 different wetland types on the basis of physical and chemical parameters such as flooding and salinity regimes. Associated with each wetland type are vegetation communities reflecting variations in estuarine habitats. In Maryland the major wetland types, vegetative community dominants, and percent of each type in the statewide wetlands are shown in Table I.

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[1] Martin, Alexander C., Neil Hotchkiss, Francis M. Uhler, and Warren S. Bourn, 1953, Classification of Wetlands of the United States, U.S. Department of Interior, Fish and Wildlife Service, Special Scientific Report, Wildlife No. 20.

TABLE I

Type	Vegetation Community Dominant(s)	Percentage of Total
7-Wooded Swamp	Red Maple, River Birch, Sweetgum, Pin Oak, and Cypress, Sourgum, Ash	22.2
12-Coastal Shallow Fresh Marsh	Cattail, Big Cordgrass, Arrow Arum, Pickerel Weed, Three Square, Rose Mallow	22.7
16-Coastal Salt Meadow	Saltmeadow Cordgrass, Saltgrass, Blackrush	25.3
17-Irregularly Flooded Salt Marsh	Needlerush	21.7
18-Regularly Flooded Salt-marsh	Saltmarsh cordgrass	4.1

All but Type 7 are always considered as part of the estuarine environment. Type 7 wetlands may or may not be considered as part of an estuarine system depending on whether they are influenced by tidal rise and fall. They are often associated with the other wetland types, and are included as part of the estuarine system.

Two major physiographic types occur in the Maryland estuarine system. They are represented by the low, flat topography of the Eastern shore and the higher, sharply rolling topography of the Western shore. Exceptions occur on limited areas of both shores. These two types are expressions of natural factors such as surficial geology, soil type, surface and subsurface hydrology, vegetation, climate, and interactions between them. These factors, in combination

with land use, control the amount and quality of water that enters the estuarine environment and the type of estuarine system that exists.

In order to acquire a complete set of sanctuaries representing the major components of the Maryland estuarine system, it was determined that one example of each wetland type-physiographic type combination should be selected. This would result in a set of eight sanctuaries scattered throughout the Chesapeake Bay and oceanside bays area as illustrated by the matrix in Table II.

TABLE II

Wetland type	Physiographic type	
	Eastern shore	Western shore
Type 12	X	X
Type 16	X	X
Type 17	X	X
Type 18	X	X

However, wetland types 17 and 18 are absent in significant areas from the Western shore according to the Maryland Wetlands Survey reducing the number of combinations to six.

In addition, it was felt that three additional types of estuarine systems based on physiographic characteristics should be included in a representative set of sanctuaries. These include islands, tributary embayments, and marshes occurring on the shoaling edge of meanders on the large tributaries to Chesapeake Bay.

However, discussions with NOAA representatives led to the rejection of the multiple-area concept. NOAA favored the selection

of a single sanctuary within the State and felt that efforts should be concentrated on the Chesapeake Bay, preferably within the middle portion of the Bay (Bay Bridge south to the Virginia State line).

The following pages provide a description of the selection process which has resulted in the selection of six potential estuarine sanctuary sites. A description and comparative evaluation of these sites is included.

II. ESTUARINE SANCTUARY SELECTION PROCESS

The selection process consisted of four separate phases including criteria development, nomination of potential sites, evaluation of sites by topographic maps and wetland aerial photographs, and evaluation of sites by on-site inspection. Evaluation of the suitability of the sites nominated as estuarine sanctuaries was based on the ability of each site to meet the criteria developed as determined by members of the Coastal Zone staff.

A. Criteria development

Site evaluation criteria were developed by numerous and lengthy discussions with scientists and field workers familiar with the estuarine environment, particularly the Chesapeake Bay. This produced an initial list of criteria which workers felt ought to be applied to any site that is selected (see Table III). The list was reduced to seven criteria because: (1) numerical values were not given by the researchers and field workers for the initial criteria which could be quantified, thus, precluding determination of

TABLE III

Suggested Criteria for Site Selection

Physical Criteria

1. Horizontal and vertical salinity gradients
2. Two layered hydraulic system
3. Tidal guts with high banks and low banks
4. Varying substrates
5. Eroding and accreting shoreline
6. Sites unaffected by draw down of water table
7. Inclusion of entire watershed
8. Achievement of dynamic equilibrium between constructive and destructive processes
9. Varied range of topographic characteristics of the upland including:
   steam gradients
   relative relief
   degree of dissection
10. Varied range of topographic characteristics of estuarine areas including:
    hydrographic and climatological orientation
    shoreline differences

Biological Criteria

1. Presence of natural shellfish beds and spawning and nursery grounds for typical Bay fish
2. Large wintering waterfowl population
3. Variety of vegetative communities
4. Large stands of Spartina alterniflora, Spartina patens, Juncus roemerianus, Distichlis spicata
5. High plant species diversity (freshwater marsh area)
6. Presence of rare and endangered species
7. High marsh and low marsh
8. Submerged aquatic plants

Other Criteria

1. Reference set of estuarine systems representative of the entire bay
2. Lack of ongoing disturbance resulting from shipping, dredging, commercial harvesting, intense recreation, housing, or commercial development or development pressures
3. Ease of acquisition
4. Compatible land/water use in adjacent areas
5. Sufficiently large area
6. Unaltered landscape and estuarine bottom
7. Presence of buffer zone
8. Proximity to educational and research facilities

representative values; (2) data and information do not exist at a scale large enough to describe or evaluate all specific sites in terms of all the initial criteria listed; and (3) no site would be able to meet all the initial criteria even if the data existed at a usable scale.

The final set of criteria was developed in consultation with a core of scientific experts representing the University of Maryland Center for Environmental and Estuarine Studies, Chesapeake Research Consortium, Maryland Geological Survey, and Maryland Department of Natural Resources. In order of importance, the final criteria by which each site was evaluated are:

1. presence of a tributary on the site;
2. Relative lack of disturbance on the site and/or compatible land/water use on the watershed;
3. wetland area in excess of 100 acres;
4. presence of a complete system -- estuary, wetlands, and uplands;
5. presence of a salinity gradient in the estuary;
6. diversity of habitats; and
7. (optional) presence of an adjacent watershed perturbed by human activity.

B. Specific site selection and elimination process

Specific sites chosen for evaluation as estuarine sanctuaries were selected from the study, Natural Areas of the Chesapeake Bay

Region: Ecological Priorities[2], as well as from suggestions made by interested citizens, field workers, and scientists familiar with the Maryland estuarine system, and from study of county topographic maps and composite sheets of wetland aerial photographs by Coastal Zone staff.

Sites were then evaluated by wetland aerial photographs on the basis of the criteria established. As far as could be determined from the aerial photographs, sites which appeared to meet all the criteria were given on-site evaluations by Coastal Zone staff. On-site inspections were made to determine present condition of the site, type and extent of land and water uses and whether such uses are compatible with the concept of estuarine sanctuaries, specific vegetation type(s) occurring on the site, and other major geographic characteristics of the proposed sanctuary.

The following steps summarize the process which led to the selection of the six areas under consideration as estuarine sanctuary sites:

1. The 232 sites identified in the 1974 Smithsonian Institution's natural areas study were analyzed by map study and/or aerial photo evaluation. Forty sites (Appendix A) were selected for more detailed aerial photo examination.

2. Twenty-eight additional areas (Appendix B) were selected for detailed aerial photo examination after scanning composite aerial photographs covering Maryland's entire tidal shoreline, and after receiving nominations from the academic community, State personnel, and environmental groups.

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[2] Center for Natural Areas, Smithsonian Institution, 1974, Natural Areas of the Chesapeake Bay Region: Ecological Priorities.

3. Intensive aerial photo examination of these 68 areas resulted in the selection of 19 superior areas for on-site inspection (Appendix C). In addition, five less desirable sites were visited for comparative purposes, and also to verify that the examination of aerial photographs was an effective method for eliminating sites.

While on-site inspections were taking place, the concept of a multiple site sanctuary that would represent the entire range of variation within the Chesapeake estuarine system was adopted by Maryland. With this concept in mind, intensive aerial photo examination resulted in the selection of seven sites (Appendix D).

4. NOAA representatives rejected the multiple site estuarine sanctuary concept and indicated that they were looking for an area with the following characteristics:

a. located adjacent to Chesapeake Bay, preferably within the salinity regime that characterizes the middle portion of the Bay (i.e., from Chesapeake Bay Bridge south to the Virginia state line);

b. include the components of a "complete system" -- some open water, wetlands, and upland;

c. contain a minimum of 800 acres;

d. be as unaffected by man-related activities (i.e., housing, agriculture, mosquito ditching) as possible .

With these additional criteria in mind, the 19 suitable areas chosen in step 3 were re-examined, and five areas (Appendix E, with the exception of Horn Point) were selected for a process

of comparative evaluation. One additional site, Horn Point, was also included in the comparative process since much of it is already State-owned and an established research institution (CEES) is located there.

III. COMPARATIVE EVALUATION OF THE FINAL SIX SITES

The six sites under consideration include Parker Creek (Calvert County), World's End Creek and Horn Point (Dorchester County), Ellis Bay Wildlife Management Area - Stump Point Marsh (Wicomico County), and East Creek and Little Monie Creek (Somerset County). A description of the sites is given in Table IV.

The following pages provide a comparison of the outstanding features and negative attributes followed by an evaluation of each site with regard to its suitability for an estuarine sanctuary site. An assumption which is made in this comparative evaluation is that, since these six sites have made it this far in the selection process, each is suitable for estuarine sanctuary designation. Although the outstanding features will play an important role in the site selected, it is felt that the negative attributes or disturbance factors should play a more important role in the elimination process and are thus emphasized.

A. Parker Creek

1. Outstanding features

Parker Creek is a narrow, shallow estuary that flows east through deeply dissected Miocene deposits of fine-grained sand and silt and fine-grained sandy clays. The site of past and

DESCRIPTION OF PROPOSED ESTUARINE SANCTUARY AREAS

	PARKER CREEK	WORLDS END CREEK	ELLIS BAY WMA STUMP PT. MARSH	LITTLE WONIE CREEK	EAST CREEK	HORN POINT
Location	East-Central Calvert Co.	So.Dorchester Co. (on Honga River)	So.Wicomico Co. (mouth of Wicomico River)	Northeast Somerset Co. (near mouth of Wicomico River)	So.Somerset Co. (empties into Pocomoke Sound)	Northern Dorc ter Co. (sout shore of Chop River)
Proposed Sanctuary Size (Acres)						
Wetland	280	2,290	4,006	863	863	62
Upland	675	1,590	1,310	2,532	2,338	791
Openwater	-	175	563	989	446	18
Total	955	4,055	5,879	4,384	3,647	871
Wetland Type	Types 6, 7, 12 & 16 -Shrub swamp -Wooded swamp -Shallow fresh marsh -Coastal salt meadow Species -Wooded swamp Acer Fraxinus Betula Nyssa Viburnum -Fresh marsh Typha -Coastal salt meadow Spartina patens Spartina cynosuroides	Types 6, 17 -Shrub swamp -Irregular flooded salt marsh Species -Spartina alterniflora -Spartina patens -Juncus roemerianus (dominant) -Spartina patens/ Distichlis spicata -Iva frutescens	Types 16, 17, 18 -Coastal salt meadow -Irregular flooded salt marsh -Regularly flooded salt marsh Species -Spartina alterniflora -Spartina patens-Distichlis spicata -Scirpus spp. -Spartina cynosuroides -Juncus roemerianus	Types 16, 17 -Coastal salt meadow -Irregular flooded salt marsh Species -Spartina alterniflora -Juncus Roemerianus	Types 6, 17 -Shrub swamp -Irregular flooded salt marsh Species -Spartina alterniflora -Spartina patens-Distichlis spicata -Juncus roemerianus -Iva frutescens -Baccharis halimifolia	Type 17 -Irregular flo salt marsh Species -Spartina alte flora -Spartina pate Distichlis s -Juncus Roemer -Phragmites -Baccharis hal mifolia -Iva frutescens

	PARKER CREEK	WORLDS END CREEK	ELLIS BAY WMA-STUMP PT. MARSH	LITTLE MONIE CREEK	EAST CREEK	HORN POINT
Impact on County Tax Base	Assessment: -Farmland- $300/acre -Marsh-$20/acre -Forest-$50/acre Tax Rate: -County-$2.55/ $100 assessed value -State-$0.21/ $100 assessed value	Assessment: -Farmland- $60-$150/acre -Marsh-$15/acre -Forest-$60- $150/acre Tax Rate: -County-$2.69/ $100 assessed value -State-$0.21/ $100 assessed value	Assessment: -Farmland- $150/acre -Marsh-$30/acre -Forest-$35/acre Tax Rate: -County-$1.90/ $100 -State-$0.21/ $100	Assessment: -Farmland- $150/acre -Marsh-$10-$50/ acre -Forest-$35- $150/acre Tax Rate: -County-$2.00/ $100 -State-$0.21/ $100	Assessment: -Farmland- $150/acre -Marsh-$10-$50/ acre -Forest-$35- $150/acre Tax Rate: -County-$2.00/ $100 -State-$0.21/ $100	———
Present Ownership	Private	Private (strong hunting club interests)	Public (WMA) Private	Private Public-marsh on both sides of mouth of creek (Deal Island WMA)	Private; including marshland owned by Maryland Ornithological Society)	Public (Univ. Md.)-836 ac Private-36 ac of marshland
Accessibility	Md. Rt. 2 (south to Md. Rt. 402 (east) to Goldstein Rd. (south) Boat: from Chesapeake Bay	Rt. 50 to Md. Rt. 16 south and west to Md. Rt. 335 South to Md. Rt. 336 east Boat: from Md. Rt. 336 (small boat only) or from Hooper Island Air: Private airstrip on Meekins Neck (Hooper Is.)	Rt. 50 to Md. Rt. 347 south to Nebo Rd. south to Nebo Rd. south to Rt. 349 west to Capitola Rd. Boat: from Mt. Vernon Wharf on Wicomico River Air: Salisbury Airport	Rt. 50 to Rt. 13 south to Rt. 362 west to Black Rd. (west) Boat: from Mt. Vernon Wharf on Wicomico River Air: Crisfield Airport	Rt. 50 to Rt. 13 south to Rt. 413 south to Rt. 357 south to St. Paul's Rd. east to Rumbly Pt. Road Boat: from Crisfield Air: Crisfield Airport	Rt. 50 to Camb Rt. 343 west t Horn Pt. Rd. Boat: Cambridg Air: private airstrip adjac to Horn Pt. la

	PARKER CREEK	WORLDS END CREEK	ELLIS BAY WMA STUMP PT. MARSH	LITTLE MONIE CREEK	EAST CREEK	HORN POINT
Upland Type	Upland deciduous forest Upland mixed forest Lowland deciduous forest	Oak-pine	Pine	Pine	Pine	Oak-gum Pine plantatic
Present Use of Proposed Sanctuary Area	Hunting Trapping Utility line right-of-way Lumbering (past)	Hunting (heavy) Trapping (heavy) Sportfishing (light) Oystering (light) Farming (light)	Dredged spoil disposal Wildlife mgmt. practices Hunting Trapping	Crabbing (Monie Bay) Hunting	Birdwatching Hunting Trapping Crabbing Oystering	Research laboratory
Surrounding Land Use--Outside Proposed Sanctuary Boundary	Limited agriculture Woodland	Wildlife mgmt. (Blackwater) Tree farm Woodland	Agriculture (predominant) Residential (light) Woodland	Wildlife mgmt. Agriculture	Agriculture (grain and poultry) Clay excavation Residential (light)	Agriculture (predominant) Woodland
Zoning	Residential Commercial (Prince Frederick area) Agriculture Conservation Floodplain	Agriculture		Conservation Agriculture	Conservation Agriculture	—
Estimated Cost of Acquisition	Marsh-$150/acre Forest-$1000/acre Farmland-$800-$1000/acre	Marsh-$150-$200/acre Upland-$300-$350/acre	Marsh-$150-$200/acre Forest-$250-$300/acre Farmland-$1000-$5000/acre	Marsh-$150-$200/acre Forest-$200/acre Farmland-$500-$800/acre	Marsh-$50-$200/acre Forest-$200/acre Farmland-$500-$800/acre	N.A.

on-going research activities, the creek exhibits a well-defined salinity gradient along its longitudinal axis and laterally on the marsh areas on both sides of the creek. An extensive zone of hardwoods begins at the marsh border and coincides with steep banks found at the edge of the marsh. The marsh areas are extensive and appear undisturbed. A small strip of dune vegetation occurs in a narrow strip parallel to the shore between the ridges of upland forest adding to the diversity of habitats found on this site.

The Parker Creek system provides an excellent example of representative estuarine lands and water ranging from fresh to brackish water, and from wooded swamp to coastal shallow marsh before its confluence with Chesapeake Bay. The mouth of the creek lies along an eroding shoreline with sand beaches extending to the north and south. Longshore Bay currents cause a shifting of the sandy sediments at the mouth of the creek, thus presenting opportunities for geologic research. The rate of sedimentation and fill along the length of the estuary is another research possibility for the geologist.

2. Negative attributes

The major shortcomings of the Parker Creek site include discharge from the Prince Frederick waste water treatment plant at the headwaters of the creek and the lack of direct road access. In addition to the Prince Frederick sewage treatment plant, a regional sewage treatment plant may be constructed just north of the mouth of the creek. Although the area provides a fine example

of a representative estuarine system, there is an absence of open water and an excessive amount of upland in comparison to marsh area (~ 2:1 ratio).

Substantial change has occurred in the area as the creek was once a navigable waterway accommodating barge traffic. It is possible that the mouth of the creek may close off naturally in the next 25-50 years, resulting in a transition of the existing diversified marsh to shrub swamp.

Other drawbacks of the site include some lumbering activities in the past and the presence of high land values.

3. Evaluation

Parker Creek provides an excellent example of a complete estuarine system in a relatively undisturbed state. A salinity gradient is apparent as well as marine, tidal, and fluvial depositional processes.

Although predominantly undisturbed, the site falls short in some of the desired natural features. These include an excess of upland area and the absence of open water. The other major drawback is the Prince Frederick sewage treatment plant. Although this plant provides tertiary treatment, it is not operating at full capacity and will expand in the future.

B. World's End Creek

1. Outstanding features

World's End Creek is a shallow tidal tributary flowing south through undifferentiated Quatermay sand and gravel and lignitic silt and clay. The shape of the estuary is characterized

by an extensive meander pattern from the creek's narrow headwaters until it straightens and broadens into a fan-shaped mouth, creating an expanse of open water near the mouth of the creek. Numerous small tributaries with no upland runoff flow through the marsh. At the southern extreme of the drainage basin near the mouth of the creek a linear pattern of ridges running in a northwest/southeast direction represent a relatively rare landform found on the Eastern Shore. An extensive marsh system is located on the site which includes wetland types 6 (shrub swamp), 7 (wooded swamp), and 17 (irregularly flooded salt marsh). The marsh is predominantly Type 17 and is dominated by Juncus roemerianus. Distinct narrow bands of Spartina alterniflora, Iva frutescens, and Spartina patens - Distichlis spicata border the creek and its tributaries in a classic pattern of zonation.

The watershed is sparsely populated and human activity appears to be limited chiefly to hunting, fishing, trapping and some limited agriculture.

2. Negative attributes

The negative attributes of this site are few. The major concerns are a small county landfill located just north of the proposed sanctuary boundary and four artificial ditches which are located at the head of the marsh tributaries in the upper watershed. These ditches appear to be the only disturbance to the marsh area. In addition, local marine police indicated that some lumbering activity did occur in the past on the upper watershed.

3. Evaluation

World's End Creek is one of the few entire watersheds

that has not been significantly impacted by human activity. It has all the desirable natural features of a representative system including open water, extensive marsh, and sufficient upland buffer. The creek's shallow depth and remoteness from centers of recreational boating ensure that it will not be overrun with large numbers of boats. The marsh area of the proposed sanctuary is unsuitable for major housing or commercial development, but may be susceptible to mosquito ditching due to the irregularity of tidal flooding and the significant frequency of pools of water on the marsh.

The drawbacks of the site appear to be of minor significance. The landfill is enclosed by pine-oak forest and poses no obvious threat to the marshes of the site. It has been closely monitored by the county and no problems have been encountered.

One of the most desirable features of this site concerns the uses of the lands and waters within the proposed sanctuary boundary as well as surrounding areas. The trapping, hunting, fishing and oystering activity are all compatible with the sanctuary concept. A potential plus is that the southwest portion of the proposed sanctuary is owned by hunting clubs. There is a possibility of conservation easement donations from these groups. The potential of incompatible uses in surrounding areas is slim due to the relative remoteness of the region. There is a potential for lumbering activity but this is unlikely due to the difficulty in removing the lumber from the area.

C. Ellis Bay WMA - Stump Point Marsh

1. Outstanding features

This site is characterized by an extensive marsh system surrounding Ellis Bay on the Wicomico River in southeast Wicomico County. There are numerous waterways throughout the site, the major ones being Broad Creek and its main tributary, Muddy Hole Creek. Broad Creek meanders south from its headwaters for approximately three miles before emptying into the north end of Ellis Bay.

The site possess the desired features of a complete system -- open water (Ellis Bay), extensive marshland, and upland forested areas located predominantly in the north and the northeast portions of the site. Marshlands on the site are diverse including Types 16, 17, and 18 (see table IV). Another desirable feature of this site is the inclusion of Ellis WMA which is already State-owned.

2. Negative attributes

The major drawbacks of the site concern undesirable surrounding land uses and human disturbance to the marshlands. There is extensive agricultural activity and residential development in the areas bordering west-northwest proposed sanctuary boundary. Another drawback in this area is the lack of adequate upland buffer. Disturbance to the marshlands consist of extensive mosquito ditching on the west side of Broad Creek and several spoil disposal areas in the south-southeast portion of the site. In addition, Ellis Bay W.M.A. is intensively managed including the use of dynamite to create potholes for waterfowl habitat.

3. Evaluation

Although the Ellis Bay WMA - Stump Point Marsh site prossesses the desired elements of a complete, diversified system, the extent of disturbance to its marshlands and the surrounding

agricultural/residential development tend to overwhelm its beneficial characteristics. The severity of disturbance to the site tends to limit the site's natural character making it incompatible with the sanctuary concept.

D. East Creek

1. Outstanding features

East Creek is a small estuary which flows south and empties into Pocomoke Sound in one of the southernmost areas of Maryland's eastern shore. The mouth of the creek is approximately one-half mile wide for a length extending about about one and one-half miles upstream. Beyond this point the creek narrows to a width of 40 to 50 feet for approximately three miles.

Extensive marshlands border the lower half of the creek and make up the lower half of the watershed. There exists a patchy open water/vegetation pattern within the wetland areas on both sides of the creek, particularly on the southern portion of the marshes on the watershed. No plant species can be said to dominate the entire marsh. Rather, a patchwork of vegetation types exists, indicating a system of pannes, potholes, and shifting drainage patterns on the marsh.

Although the watershed is extremely flat, interesting topographic patterns can be identified and pose interesting geomorphological questions. Throughout the marshlands are areas of slight elevation supporting stands of loblolly pine and juniper. Over the area as a whole these patches of elevated ground suggest the presence of an older meandering pattern.

2. Negative attributes

Although the East Creek site is one of the few areas of Somerset County that has not been ditched for mosquito control, channels have been dredged and spoil has been dumped on the high marsh in the northeast section of the marshlands of the watershed. These channels and Rumbly Point Road, which crosses the marsh to the east of East Creek, alter the drainage regime of the marsh to an indeterminate extent. Another threat to the integrity of the estuary as a sanctuary comes from extensive upstream farming activity. Several of the farms are poultry farms and represent potential (if not already real) sources of nutrient loading to the estuarine system. In addition, much of the agricultural land is ditched and water is culverted directly into the creek. Other human disturbance in the upper watershed is evidenced by several clay borrow pits which are used for county road building operations. One of these has a meander connecting it directly to the creek.

3. Evaluation

The outstanding features of the East Creek system are the presence of open water and its extensive marsh area which is diverse in vegetation. The major drawback to the area is the high degree of human disturbance which exists in the upper watershed. Although the marsh is still healthy, it is likely that human activity is affecting water quality in the creek and will cause alteration to the marsh in the future.

The areas remote location also causes a distance problem for potential researchers.

E. Little Monie Creek

1. Outstanding features

Little Monie Creek is a small estuary which flows in a westerly direction, emptying into Monie Bay in northwest Somerset County. Extensive marshlands border the creek in the lower watershed but then become narrow and border the creek in a fringe type fashion in the upper watershed. The marshlands are Type 16 and 17 wetlands dominated by Spartina alterniflora and Juncus roemerianus.

One of the more desirable features of the site is the undeveloped character of the lands which surround the lower and middle portions of the watershed. The marsh in the lower watershed is bordered on both sides by Deal Island W.M.A. and the middle portion of the watershed is upland forest.

2. Negative atributes

The major drawback with Little Monie Creek is the presence of extensive agricultural activity in the upper watershed. In this area fringe marsh borders the creek which is backed by farmland. Although a narrow vegetative buffer surrounds the fringe marsh, it is likely that the system is susceptable to large amounts of agricultural runoff. Difficulties in acquisition and subsequent control could be encountered due to the fact the Little Monie Creek and several of its tributaries extend considerably into agricultural areas in the upper watershed.

Other negative features of the site are the presence of some mosquito ditching south of the creek in the lower watershed and the relative absence of open water on the site itself.

3. Evaluation

The Little Monie Creek site is a fine example of representative estuarine system in a relatively undisturbed state. Its only

drawback in this regard is the absence of open water which would be a desirable feature. Although the shortcomings of the site are few, the agricultural activity and potential acquisition and control problems tend to detract from the site's desirability for an estuarine sanctuary.

F. Horn Point

1. Outstanding features

The Horn Point site is located in northern Dorchester County on the southern shore of the Choptank River. Although the site falls short of some of the initial criteria and desirable natural characteristics, it is included in the evaluation because the majority of it is already state owned and is the location of an established research institution, the University of Maryland Center for Environmental and Estuarine Studies (CEES). The presently owned marshland on the site consists of a 14 - acre marsh along a tidal creek which runs north into the Choptank River on the east side of Horn Point. There are plans to acquire an additional 36 acres of marshland.

2. Negative attributes

Two of the major drawbacks to the Horn Point site are that the marshland on the site is extremely small and there is extensive agricultural activity over the entire area making the marsh highly susceptible to agricultural runoff. The only upland forested areas are located in the extreme inland portion of the site.

The 14- acre marsh on the site has undergone extensive alteration. At the mouth of the creek a two-meter wide spillway

with a concrete floor has been constructed. This structure affects the tidal level of the marsh because the tide always flows out for a longer period of time than in and creates a "sill effect". Occasionaly, if the incoming tide is very small, the marsh may drain for 18-24 hours before the tide becomes high enough to reenter the marsh. A small pond has also been formed at the beginning of the spillway by dredging.[3] A causeway has also been constructed across the marsh near the mouth of the creek. Toward the headwaters of the creek a road has been constructed across the marsh. The only connection to the back portion of the marsh is by a 24" culvert running under the road. This has resulted in an abrupt alternation of the salinity gradient and has created an "unnatural" or artificial fresh Hibiscus marsh at the headwaters of the creek.

3. Evaluation

The major advantage of the Horn Point site is the existing public ownership of the property and the presence of CEES, an institution dedicated to estuarine research. However, the facilities of CEES and the extensive alteration of the marsh indicate that the site no longer exists in its natural state. Since the major objective of the program is to designate as natural an area as possible for baseline research, the disturbance to the Horn Point site make it unsuitable for an estuarine sanctuary.

---

[3]Donald R. Cahoon, Net Productivity of Emergent Vegetation at Horn Point Salt Marsh, M.S. Thesis, University of Maryland, 1975 pp. 11,13.

APPENDIX A

Sites identified in the Smithsonian Institution's report, Natural Areas of the Chesapeake Bay Region: Ecological Priorities, after map study of all the sites and/or preliminary aerial photo evaluation

Cecil County

*Cabin John Creek
*Pond Creek
*Principio Creek

Kent County

*Tavern Creek
*Church Creek

Queen Anne's County

*Reed Creek
*Warehouse Creek
*Kent Point
*Wye River (headwaters)
*Wye East River (headwaters)

Talbot County

*Tuckhoe Creek
*Miles Creek
*Choptank River Marshes

Caroline County

*Hunting Creek
*Choptank River Marshes

Dorchester County

*World's End Creek
*Nanticoke River Marshes

Wicomico County

*Rewastico Creek
*Quantico Creek
*Stump Point Marsh
*Nanticoke River Marshes

Somerset County

*East Creek
*South Marsh Island

St. Mary's County

*St. Mary's River
*Chaptico Run

Charles County

*Allen's Fresh
*Nanjemoy Creek
*Ward's Run
*Chicamuxen Creek

Calvert County

*Patuxent River Marshes
*Fishing Creek
*Parker Creek
*Jack Bay
*Flag Ponds
*Deep Landing
*Hall Creek

Anne Arundel County

*Cheston Creek
*Muddy Creek

Baltimore County

*Hart and Miller Islands

Worcester County

*Pocomoke River

APPENDIX B

Additional sites added after nominations from the academic community, State personnel, and environmental groups, and after scanning composite aerial photographs

Queen Anne's County

*Fairlee Neck
*Greenwood Creek
*Wye Island/Wye Narrows

Dorchester County

*Fishing Bay
*Slaughter Creek
*James Island

Wicomico County

*Ellis Bay Wildlife Management Area

Somerset County
*Little Monie Creek
*Monie Creek
*Manokin River/Deal Island WMA
*Big Annemessex River/Fairmount WMA
*Cedar Island WMA
*Apehole Creek/ Pocomoke Sound WMA
*Gunby Creek
*Marumsco Creek
*Broad Creek

Worcester County

*Trappe Creek
*Marshy Creek
*Waterworks Creek
*Purnell Pond
*Boxiron Creek
*Scarboro Creek/E.A. Vaughn WMA
*Pikes Creek

Calvert County

*Plum Point Creek

Anne Arundel County

*Hackett Point

Harford County

*Carroll Island
*Romney Creek
*Monks Island

APPENDIX C

Sites selected for on-site inspection

Cecil County

*Pond Creek
*Cabin John Creek

Kent County

*Church Creek
*Tavern Creek+

Dorchester County

*Slaughter Creek
*World's End Creek

Wicomico County

*Ellis Bay WMA - Stump Point Marsh
*Quantico Creek
*Rewastico Creek

Somerset County

*South Marsh Island
*East Creek
*Little Monie Creek

Worcester County

*Trappe Creek
*Scarboro Creek/E.A. Vaughn WMA

Charles County

*Nanjemoy Creek
*Ward's Run
*Burgess Creek+

Calvert County

*Deep Landing
*Hall Creek
*Gott's Marsh (Patuxent Marsh)
*Parker Creek
*Plum Point Creek+
*Fishing Creek+
*Flag Ponds+

+unsuitable sites visited for comparative purposes only

APPENDIX D

Sites selected for multiple sanctuary proposal to NOAA

Cecil County

*Pond Creek

Dorchester County

*World's End Creek

Somerset County

*South Marsh Island

Worcester County

Scarboro Creek/E.A. Vaughn WMA

Calvert County

*Gott's Marsh (Patuxent River Marsh)
*Parker Creek

Harford County

*Romney Creek

APPENDIX E

Sites selected for Comparative Evaluation

Calvert County

*Parker Creek

Dorchester County

*Horn Point
*World's End Creek

Wicomico County

*Ellis Bay Wildlife Management Area - Stump Point Marsh

Somerset County

*East Creek
*Little Monie Creek

Appendix 3(c)

Correspondence for Maryland

Estuarine Sanctuary Steering Committee

1980

JAMES B. COULTER
SECRETARY

(301) 269-2784

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
TIDEWATER ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS 21401

May 14, 1980

We have talked about this many times; and finally, I am able to say that we are beginning to move on the Estuarine Sanctuary Program.

After having testified in favor of reauthorization of the Federal Coastal Zone Management Act, and after reading several proposals for rewording that section in the Act, I find that there is a "movement afoot" to de-emphasize the pristine characteristics of such an area and to strive for one with characteristics of a more educational and research nature. This was confirmed in discussions which Dr. John Williams of my staff and I had with Federal OCZM Sanctuaries Program Staff.

Presently we have been reviewing our State program to prepare for establishing a Steering Committee to reevaluate potential sites, given these new Federal guidelines. This committee will consider appropriate sanctuary locations and make recommendations as to which are most suitable for education/research as well as being representative of other areas in the Bay system.

The first Steering Committee meeting will be held on Thursday, May 29, 1980, at 9:30 a. m., in the D-4 Conference Room in the Tawes State Office Building in Annapolis.

We will appreciate your participation on this Steering Committee to assist the State of Maryland in developing its Estuarine Sanctuaries Program. If you or your representative will not be able to attend the May 29 meeting, please notify us.

Thank you for your assistance.

Sincerely,

Dr. Sarah Taylor, Director
Coastal Resources Division

ST:lr

JAMES B. COULTER
SECRETARY

LOUIS N. PHIPPS, JR.
DEPUTY SECRETARY

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
TIDEWATER ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS 21401

MEMORANDUM

June 9, 1980

TO: Steering Committee Members

FROM: Dr. Sarah Taylor, Director - Coastal Resources Division

SUBJECT: Evaluation criteria and site descriptions for proposed estuarine sanctuary sites.

On May 29, 1980 the Estuarine Sanctuaries Steering Committee met to discuss renewed efforts within Coastal Resources Division to develop an Estuarine Sanctuaries Program for the State of Maryland. The overall objectives of OCZM's Sanctuaries Program were discussed followed by a presentation by Elder Ghigiarelli of guidelines and site evaluations previously developed. The committee then developed a series of evaluation criteria to be used in the present site selection process.

I have included the evaluation criteria decided upon by the committee in this mailing along with descriptions of some of the eight sites identified by the committee. Each committee member should review this material and send the following information to my office by Monday June 23: (1) a weighting of each of the evaluation criteria. (Based upon a total of 100 points, assign to each criterion that fraction of the total points which you feel reflects its importance. For example criterion #1 might receive 30 points, while each of the other seven criteria only received 10 points each.); (2) any additional information you feel would be useful for evaluating any of the eight sites.

CRD staff are still compiling information for sites which could not be included in this mailing, but you will receive it in a few days.

Complete information for evaluating each site will then be sent to you the first week in July. Using this information and the criteria, you will be requested to rank each site relative to each other and discuss these rankings to arrive at a final site selection at a July 18 Meeting.

The final eight sites selected by the committee were:

1. Parker Creek
2. Horn Point
3. World's End Creek
4. Little Monie Creek
5. Zekiah Swamp
6. Nanjemoy Creek
7. Rhode River
8. Warehouse Creek

S.JT/cjg

Criteria for Site Evaluation

Primary Criteria

1) Presence of a complete system - estuary, wetlands, and uplands

   a). Presense of a tributary on the site. Is tributary entirely within site boundaries?

   b) Wetland area comprises a significant percentage of of the site area.

   c) Presence of a salinity gradient along the estuarine portion of the site.

2) Relative lack of disturbance on the site and/or compatible land/water use within the watershed.

3) Suitability of the site for educational and estuarine research activities.

4) Representative of larger portions of Maryland's Chesapeake Bay estuarine system.

5) Presence of endangered species within site.

6) Proximity of site to other State or Federal protected natural areas.

7) Diversity of habitats within site boundaries.

8) Ease of acquisition.

JAMES B. COULTER
SECRETARY

LOUIS N. PHIPPS, JR.
DEPUTY SECRETARY

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
TIDEWATER ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS 21401

(301)269-2784

June 26, 1980

MEMORANDUM

TO: Estuarine Sanctuaries Steering Committee

FROM: Sarah J. Taylor, Director, Coastal Resources Division

SUBJ: Next Meeting and Site Information

The next Estuarine Sanctuaries Steering Committee meeting will be from 9:30 a. m. - 12 noon on Friday, July 18 in the C-4 Conference Room, Tawes State Office Building, Annapolis, Maryland. Evaluations of the different sites using the criteria mailed previously will be discussed at this time. It is hoped priorities for different sites can be developed and a primary site selected at this meeting.

Enclosed in this mailing are additional site descriptions for Rhode River, Zekiah Swamp, Nanjemoy Creek, and Warehouse Creek.

With regard to information for Rhode River, the Inventory Form will be most relevant.

Evaluation information for Little Monie Creek is being developed by CRD staff and will be mailed later

Please notify us if you or your representative will be unable to attend.

SJT:JW:lr
enc.

JAMES B. COULTER
SECRETARY

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
TIDEWATER ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS 21401

LOUIS N. PHIPPS, JR.
DEPUTY SECRETARY

(301) 269-2784

July 10, 1980

TO: Estuarine Sanctuaries Steering Committee

FROM: Sarah J. Taylor, Director
Coastal Resources Division

SUBJ: Next Meeting and Site Information

This memo is to remind you of the Estuarine Sanctuaries Steering Committee meeting from 9:30 a.m. to 12:00 noon on Friday, July 18 in the C-4 Conference Room, Tawes State Office Building, Annapolis, Maryland and to provide information on two additional sites, Little Monie Creek and Horn Point.

Please bring all the site description information with you to the July 18 meeting as additional copies are unavailable. This meeting is designed to develop priorities for the different sites and to select a primary site.

SJT/JW/dmt

Estuarine Sanctuaries
5/29/80

Name	Agency	Phone
John B. Williams	CRD	269 2784
Ronald P. Hatton	National Marine Fisheries Service	226-5771
W.P. Jensen	Tidewater Admin. - Tidal Fisheries	269-3558
Betty Dickinson	Wye Institute	827-7401
Malcolm E. King	Izaak Walton League	926-8713
[illegible]	[illegible]	383-4264
Carlo R. [illegible]	Md Wildlife Adm.	269 [illegible]
Dennis Taylor	U of Md. CEES	228-9250
Elder Ghiziarelli	CRD	269-2784
Jim Kelvin	BLM, USDI	(202) 343-7417
George Jenwick	The Nature Conservancy	703-841-5326
[illegible]	[illegible]	269-3871
J. Eugene Cronin	Chesapeake Research Consortium	213-0884
J. Kevin Sullivan	CBCES, Smithsonian	798-4424
JOHN D. BALLING	CBCES, SMITHSONIAN	798-4424
Marguerite Whilden	WRA, National Flood Ins.	301 269 3825
Earl Bradley	CRD - DDR	269-2784
[illegible]	OCZM, NOAA	(202) 634-4236
Gloria Thompson	"	"

Sanctuaries Steering Committee
Meeting

July 18, 1980

Attendance

Name	Agency	Phone
Judy Johnson	Committee to Preserve Assateague	828-4520
Judy Rossler	[illegible]	659-6440
Elder Ghigiarelli	CZM	269-2784
Dennis Taylor	[illegible]	228-[illegible]
Paul M Brucknbaugh	Md Wildlife Federation	752-5614
D U Carley (R.R. Colwell)	Sea Grant	454-6420
Harold Cassell	Water Resources Admin	269-3871
[illegible]	[illegible]	269-[illegible]
Suzanne Nair	U.S. Fish & Wildlife Ser.	269-5448
J. Kevin Sullivan	Smithsonian	798-4424
Frank D. Christhilf	NOAA/OCZM	202/634-4236
GLORIA THOMPSON	NOAA/OCZM	"
Ronald D. Gatton	NOAA/NMFS	226-5771
George H. Fenwick	The Nature Conservancy	202/841-5326
Joseph J. Cooney	Chesapeake Biological Laboratory, UMCEES	326-4281

JAMES B. COULTER
SECRETARY

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
TIDEWATER ADMINISTRATION
TAWES STATE OFFICE BUILDING
ANNAPOLIS 21401

LOUIS N. PHIPPS, JR.
DEPUTY SECRETARY

269-2784

September 9, 1980

TO: Estuarine Sanctuaries Steering Committee

FROM: Dr. John B. Williams
Coastal Resources Division

SUBJECT: Next Meeting and Summary of August Activities

The next meeting for the Steering Committee will be held on Wednesday, September 24, 1980, at 9:30 A.M. in the D-4 Conference Room, Tawes Building, Annapolis, Maryland. This is a very important meeting since a final sanctuary site will be selected and a Sanctuary Management Committee of about seven members will be determined. The final site will be submitted to OCZM for pre-acquisition funding. Please notify us if you or your representative will be unable to attend.

As we discussed at our last meeting in July the top four sites were pursued nearly simultaneously. Property owners were contacted by staff from Maryland Environmental Trust, while County Commissioners and State Delegations were contacted by State and Federal CZM staff. We held to our basic criterion that if contacts with property owners holding tracts essential for the sanctuary revealed a reluctance to participate, then that site would be removed from further consideration due to the short time frame we were operating under.

This has resulted in World's End Creek and Parker Creek being removed from further consideration. Also, information received from the Calvert County Board of Commissioners indicated the sewage treatment plant discharge into Parker Creek could potentially be doubled. The two sites remaining under consideration are Muddy Creek/Rhode River in Anne Arundel County and Little Monie Creek in Somerset County. Public meetings are being scheduled and information for choosing a final site is being prepared for the September 24th Steering Committee meeting.

The Public Meeting for Little Monie Creek is scheduled for Monday, September 22, 1980, at 7:00 P.M. in the Somerset County Courthouse in Princess Anne, Maryland.

Sincerely,

JBW/cl

John B. Williams, PhD
Coastal Reosurces Division

September 17, 1980 - Meeting with Chesapeake Bay Center for Environmental Studies regarding Rhode River as an estuarine sanctuary.

Participants

David Correll, Associate Director for Science, CBCES	301/798-4424
John Falk, Associate Director for Education, CBCES	301/798-4424
Kevin Sullivan, Director, CBCES	301/798-4424
Donald L. Wilhelm, Administrative Officer, CBCES	301/798-4424
Ross Simons, Program Manager, Office of Asst. Secretary for Science, Smithsonian Institute	202/357-2939
Alan D. Ullberg, Associate General Counsel, Smithsonian	202/357-2583
John B. Williams, Maryland CZM Office	301/269-2786
Frank D. Christhilf, Estuarine Sanctuary Project Officer OCZM/NOAA	202/653-7301
Gloria Thompson, Program Support, OCZM/NOAA	202/653-7301

Appendix 3(d)

Site Selection Work Sheets

AGENDA

Estuarine Sanctuary Steering Committee Meeting

Friday July 18,1980

0930 to 1200

930	Introduction and future activities
940	Compile rankings of sites
1030	Total site weights and rankings
1030-1230	Discuss Site Selections

ESTUARINE SANCTUARIES STEERING COMMITTEE WEIGHTINGS
FOR
SITE EVALUATION CRITERIA
USED AT MEETING ON FRIDAY JULY 18,1980

STATISTICS FOR CRITERIA WEIGHTINGS

CRITERIA	RESPONSES	MEAN SCORE	MINIMUM SCORE	MAXIMUM SCORE	RANGE	STDERR
COMPLETE SYSTEM PRESENT	12	30	15	45	30	2
LACK OF DISTURBANCE	12	15	10	30	20	2
EDUCATION / RESEARCH SUITABILITY	12	13	5	20	15	2
REPRESENTATIVE OF LARGER BAY SYST	12	13	5	30	25	2
ENDANGERED SPECIES PRESENT	12	6	0	20	20	2
PROXIMITY TO ST/FED NATURAL AREAS	12	6	0	10	10	1
DIVERSITY OF HABITATS	12	10	5	25	20	1
EASE OF ACQUISITION	11	8	3	20	17	2

INDIVIDUAL SUMMARY SHEET
FOR
SANCTUARY SITE RANKINGS

Criteria	Parker Creek	Horn Point	World's End	Little Monie	Zekiah Swamp	Nanjemoy Creek	Rhode River	Warehouse Creek
1. Complete system present								
2. Lack of disturbance								
3. Education/research suitability								
4. Representative of Larger Bay areas								
5. Endangered species present								
6. Proximity to St/Fed Natural areas								
7. Diversity of habitats								
8. Ease of acquisition								
TOTALS								

Sites

Please rank the above sites for each of the eight criteria according to the information you have reviewed during the last month.

Assign a value of 10 to the site if it completely meets a criterion and lower values (down to 0) if a site only partially meets a criterion.

Put your values in the upper half of each box.

WEIGHTED RANKINGS

CRITERIA	WEIGHT	RANKINGS 10	9	8	7	6	5	4	3	2	1	
1	30	300	270	240	210	180	150	120	90	60	30	
2	15	150	135	120	105	90	75	60	45	30	15	
3	13	130	117	104	91	78	65	52	39	26	13	
4	13	130	117	104	91	78	65	52	39	26	13	
5	6	60	54	48	42	36	30	24	18	12	6	
6	6	60	54	48	42	36	30	24	18	12	6	
7	10	100	90	80	70	60	50	40	30	20	10	
8	8	80	72	64	56	48	45	32	24	16	8	

Place the correct weighted ranking on your individual summary sheet in the lower half of each box.

Total these values at the bottom of column for each site.

Appendix 4A

Common Fishes of the Rhode River Estuary

Aleltes quadracus	—	4-Spined Stickleback
Anchoviella mitchilli	—	Anchovy
Anguilla rostrata	—	Eel
Brevoortia tyrannus	—	Menhaden
Dorosoma cepedianum	—	Gizzard Shad
Cyprinodon variegatus	—	Sheepshead Minnow
Cyprinus carpio	—	Carp
Esox niger	—	Chain Pickerel
Fundulus diaphanus	—	Freshwater Killifish
Fundulus heteroclitus	—	Mummichog
Fundulus majalis	—	Striped Killifish
Gobiosoma bosci	—	Naked Goby
Ictalurus catus	—	Gray Catfish
Ictalurus nebulosus	—	Brown Catfish
Leiostomus xanthrus	—	Spot
Lepomis gibbosus	—	Pumpkinseed
Lepomis macrochirus	—	Bluegill
Lucania parva	—	Rainwater Fish
Menidia sp.	—	Silverside
Morone americana	—	White Perch
Morone saxatilis	—	Rockfish
Notemigonus crysoleucas	—	Shiner
Perca flavescens	—	Yellow Perch
Pomatomus saltatrix	—	Bluefish
Pomoxis annularis	—	Crappie
Strongylura marina	—	Needlefish
Syngnathus fuscus	—	Pipefish
Trinectes maculatus	—	Hog Choker

Appendix 4B

Birds of the Rhode River Estuary

Birds of the Chesapeake Bay Center

compiled by

W.J.L. Sladen, F.S.L. Williamson, and J.F. Lynch

(S = summer resident, W = winter resident, P = permanent resident, V = visitor or migrant)

Common Loon (Gacia immer)	V
Red-necked Grebe (Podiceps grisegena)	V
Horned Grebe (Podiceps auritus)	V
Pied-billed Grebe (Podilymbus podiceps)	V
Great Blue Heron (Ardea herodias)	P
Green Heron (Butorides virescens)	S
Little Blue Heron (Florida caerulea)	V
Cattle Egret (Bubulcus ibis)	V
Common Egret (Casmerodius albus)	V
American Bittern (Botaurus lentiginosus)	V
Whistling Swan (Olor columbianus)	W
Canada Goose (Branta canadensis)	W
Mallard (Anas platyrhynchos)	P
Black Duck (Anas rubripes)	P
Gadwall (Anas strepera)	V
Pintail (Anas acuta)	V
Green-winged Teal (Anas carolinensis)	V
Blue-winged Teal (Anas discors)	V
American Widgeon (Mareca americanus)	W
Shoveler (Spatula clypeata)	V
Wood Duck (Aix sponsa)	S
Redhead (Aythya americana)	W
Ring-necked Duck (Aythya collaris)	W
Canvasback (Aythya valisneria)	W
Greater Scaup (Aythya marila)	W
Lesser Scaup (Aythya affinis)	W
Common Goldeneye (Bucephala clangula)	W
Bufflehead (Bucephala albeola)	W
Oldsquaw (Clangula hyemalis)	W
Ruddy Duck (Oxyura jamaicensis	W
Hooded Merganser (Lophodytes cucullatus)	V
Common Merganser (Mergus merganser)	V
Red-breasted Merganser (Mergus serrator)	W
Turkey Vulture (Cathartes aura)	P
Black Vulture (Coragyps atratus)	S
Sharp-shinned Hawk (Accipiter striatus)	V
Cooper's Hawk (Accipiter cooperi)	V
Red-tailed Hawk (Buteo jamaicensis)	P
Red-shouldered Hawk (Buteo lineatus)	P
Broad-winged Hawk (Buteo platypterus)	P
Bald Eagle (Haliaeetus leucocephalus)	P

Osprey (Pandion haliaetus)	S
Kestrel (Falco sparverius)	P
Bobwhite (Colinus virginianus)	P
Ring-necked Pheasant (Phasianus colchicus)	P
American Coot (Fulica americanus)	V
Kildeer (Charadrius vociferus)	P
American Woodcock (Philohela minor)	S
Common Snipe (Capella gallinago)	V
Spotted Sandpiper (Actitis macularia)	V
Solitary Sandpiper (Tringa solitaria)	V
Greater Yellowlegs (Totanus melanoleucus)	V
Lesser Yellowlegs (Totanus flavipes)	V
Least Sandpiper (Erolia minutilla)	V
Great Black-backed Gull (Larus marinus)	W
Herring Gull (Larus argentatus)	P
Ring-billed Gull (Larus delawarensis)	P
Laughing Gull (Larus atricilla)	S
Bonaparte's Gull (Larus philadelphia)	V
Forster's Tern (Sterna forsteri)	S
Common Tern (Sterna hirunda)	S
Roseate Tern (Sterna dougalli)	V
Rock Dove (Columba livia)	P
Mourning Dove (Zenaidura macroura)	P
Yellow-billed Cuckoo (Coccyzus americanus)	S
Black-billed Cuckoo (Coccyzus erythropthalmus)	S
Screech Owl (Otus asio)	P
Great Horned Owl (Bubo virginianus)	P
Barred Owl (Strix varia)	P
Chuck-Will's Widow (Caprimulgus carolinensis)	S
Whip-poor-will (Caprimulgus vociferus)	V
Common Night Hawk (Chordeiles Minor)	S
Chimney Swift (Cnaetura pelagica)	S
Ruby-throated Hummingbird (Archilochus colubris)	S
Belted Kingfisher (Megaceryle alcyon)	P
Common Flicker (Colaptes auratus)	P
Pileated Woodpecker (Dryocopus pileatus)	P
Red-bellied Woodpecker (Centurus carolinus)	P
Red-headed Woodpecker (Melanerpes erythrocephalus)	V
Yellow-bellied Sapsucker (Sphyrapicus varius)	V
Hairy Woodpecker (Dendrocopos villosus)	P
Downy Woodpecker (Dendrocopos pubescens)	P
Eastern Kingbird (Tyrannus tyrannus)	S
Great-crested Flycatcher (Myiarchus crinitus)	S
Eastern Phoebe (Sayornis phoebe)	S
Acadian Flycatcher (Empidonax virescens)	S
Traill's Flycatcher (Empidonax trailli)	V
Least Flycatcher (Empidonax minimus)	V
Eastern Wood Pewee (Contopus virens)	S
Horned Lark (Eremophila alpestris)	W
Tree Swallow (Iridoprocne bicolor)	V

Bank Swallow (Riparia riparia)	V
Rough-winged Swallow	S
Barn Swallow (Hirundo rustica)	S
Cliff Swallow (Petrochelidon pyrrhonota)	S
Purple Martin (Progne subis)	S
Blue Jay (Cyanocitta cristata)	P
Common Crow (Corvus brachyrhnchos)	P
Fish Crow (Corvus ossifragus)	P
Carolina Chickadee (Parus carolinensis)	P
Tufted Titmouse (Parus bicolor)	P
White-breasted Nuthatch (Sitta carolinensis)	P
Red-breasted Nuthatch (Sitta canadensis)	V
Brown Creeper (Certhia familiaris)	W
House Wren (Troglodytes aedon)	S
Winter Wren (Troglodytes troglodytes)	W
Carolina Wren (Thryothorus ludovicianus)	P
Long-billed Marsh Wren (Telmatodytes palustris)	V
Mockingbird (Mimus polyglottos)	P
Catbird (Dumetella carolinensis)	S
Brown Thrasher (Toxostoma rufum)	S
Robin (Turdus migratorius)	S
Wood Thrush (Hylocichla mustelina)	S
Hermit Thrus (Hylocichla guttata)	V
Swainson's Thrush (Hylocichla ustulata)	V
Veery (Hylocichla fuscescens)	V
Eastern Bluebird (Sialia sialis)	S
Blue-gray Gantcatcher (Polioptila caerulea)	S
Colden-crowned Kinglet (Regulus satrapa)	W
Ruby-crowned Kinglet (Regulus calendula)	W
Water Pipit (Anthus spinoletta)	V
Cedar Waxwing (Bonbycilla cedrorum)	W
Starling (Sturnus vulgaris)	P
White-eyed Vireo (Vireo griseus)	S
Yellow-throated Vireo (Vireo flavifrons)	S
Solitary Vireo (Vireo solitarius)	V
Red-eyed Vireo (Vireo olivaceus)	S
Black and White Warbler (Mniotilta varia)	V
Prothonotary Warbler (Protonotaria citrea)	V
Worm-eating Warbler (Helmintheros vermivorus)	S
Golden-winged Warbler (Vermivora chrysoptera)	V
Blue-winged Warbler (Vermivora pinus)	V
Nashville Warbler (Vermivora ruficapilla)	V
Northern Parula Warbler (Parula americana)	S
Yellow Warbler (Dendroica petechia)	V
Magnolia Warbler (Dendroica magnolia)	V
Cape May Warbler (Dendroica tigrina)	V
Black-throated Green Warbler (Dendroica virens)	V
Yellow-rumped Warbler (Dendroica coronata)	W
Cerulean Warbler (Dendroica cerulea)	V
Blackburnian Warbler (Dendroica fusca)	V

Yellow-throated Warbler (Dendroica dominica)	S
Chestnut-sided Warbler (Dendroica pennsylvanica)	V
Bay-breasted Warbler (Dendroica castanea)	V
Blackpoll Warbler (Dendroica striata)	V
Pine Warbler (Dendroica pinus)	S
Prairie Warbler (Dendroica discolor)	S
Palm Warbler (Dendroica palmarum)	V
Canada Warbler (Wilsonia canadensis)	V
Ovenbird (Seiurus aurocapillus)	S
Louisiana Water Thrush (Seiurus motacilla)	S
Northern Water Thrush (Seiurus novaboracensis)	V
Kentucky Warbler (Oporornis formosus)	S
Connecticut Warbler (Oporornis agilis)	V
Yellowthroat (Geothlypis trichas)	S
Yellow-breasted Chat (Icteria virens)	S
Hooded Warbler (Wilsonia citrina)	S
Wilson's Warbler (Wilsonia pusilla)	V
American Redstart (Setophaga ruticilla)	V
House Sparrow (Passer domesticus)	P
Bobolink (Dolichonyx oryzivorus)	V
Eastern Meadowlark (Sturnella magna)	P
Redwing Blackbird (Agelius phoeniceus)	P
Orchard Oriole (Icterus spurius)	S
Northern Oriole (Icterus galbula)	V
Common Grackle (Quiscalus quisculus)	P
Brown-headed Cowbird (Molothrus ater)	P
Scarlet Tanager (Piranga olivacea)	S
Summer Tanager (Piranga rubra)	V
Cardinal (Richmondena cardinalis)	P
Rose-breasted Grosbeak (Pheucticus ludovicianus)	V
Blue Grosbeak (Guiraca caerulea)	S
Indigo Bunting (Passerina cyanea)	S
Purple Finch (Carpodacus purpureus)	V
American Goldfinch (Spinus tristis)	P
Rufous-sided Towhee (Pipilo erythrophthalmus)	P
Savannah Sparrow (Passerculus sandwichensis)	V
Grasshopper Sparrow (Ammodramus savannorum)	S
Sharp-tailed Sparrow (Ammospiza caudacuta)	V
Common Junco (Junco hyemalis)	W
Tree Sparrow (Spizella arborea)	W
Chipping Sparrow (Spizella passerina)	S
Field Sparrow (Spizella pusilla)	P
White-throated Sparrow (Zonotrichia albicollis)	W
Swamp Sparrow (Melospiza georgiana)	W
Song Sparrow (Melospiza melodia)	P

APPENDIX 5A

FISH SPECIES COLLECTED ADJACENT TO THE PROPOSED MONIE BAY SITE

Species
Fundulus heteroclitus
Fundulus luciae
Fundulus majalis
Lucania parva
Gambusia affinis
Cyprinodon variegatus
Menidia beryllina
Anguilla rostrata
Morone americana
Leisostomus xanthurus
Pomatomus saltatrix
Gasterosteus aculeatus
Brevoortia tyrannus
Elops saurus

From Lesser, C.R. and D. Saveikis, 1979.) A Study of the Impacts of a Mosquito Control Integrated Pest Management Program on Selected Parameters of the Ecology of Chesapeake Bay High Marsh Communities in Maryland. Report to Maryland Department of Agriculture, 195 pp.

APPENDIX 5B

BIRD SPECIES IN THE VICINITY OF THE MONIE BAY SITE

SPECIES

AVIAN

COMMON NAME	SCIENTIFIC NAME
Bobwhite quail	Colinus virgininianus
Bufflehead	Bucephala albeola
Canvasback	Aythya valisineria
Coot, American	Fulica americana
Dove, Mourning	Zenaidura macroura
Duck, Black	Anas rubripes
Duck, Ring-necked	Aythya collaris
Duck, Ruddy	Oxyura jamaicensis
Duck, Wood	Aix sponsa
Gadwall	Anas strepera
Gallinule, Common	Gallinula chloropus
Goldeneye, Common	Bucephala clangula
Goose, Canada	Branta canadensis
Goose, Snow	Chen hyperborea
Mallard	Anas platyrhynchos
Merganser, Common	Mergus merganser
Merganser, Hooded	Lophodytes, cucullatus
Merganser, Red-Breasted	Mergus serrator
Old Squaw	Clangual hyemalis
Pintail	Anas acuta
Rail, Clapper	Rallus longirostria
Rail, King	Rallus elegans
Rail, Sora	Porzana carolina
Rail, Virginia	Rallus limicola
Redhead	Aythya americana
Scaup, Greater	Aythya marila
Scaup, Lesser	Aythya affinis
Scoter, Common (black)	Oidemia nigra
Scoter, Surf	Melanitta perspicillata
Scoter, White Winged	Melanitta deglandi
Shoveler	Spatula clypeata
Snipe, Wilson's	Capella gallinago
Swan, Whistling	Olor columbianus
Teal, Blue-Winged	Anas discors
Teal, Green-Winged	Anas carolinensis
Widgeon, American	Mareca americana
Woodcock, American	Philohela minor

SPECIES

AVIAN

COMMON NAME	SCIENTIFIC NAME
Bittern, American	Botaurus lentiginosus
Bittern, Least	Ixobrychus exilis
Blackbird, Red-Winged	Agelaius phoeniceus
Cormorant, Double-Crested	Pralacrocorax auritus
Crow, Common	Corvus brachyrhynchos
Crow, Fish	Corvus ossifragus
Dunlin	Erolia alpina
Eagle, Bald	Haliaeetus leucocephalus
Egret, Common	Casmerodius albus
Egret, Snowy	Leucophoyx thula
Egret, Cattle	Bubulcus ibis
Grackle, Boat-Tailed	Cassidix mexicanus
Grackle, Common	Quiscalus quiscula
Grebe, Horned	Colymbus auritus
Grebe, Pied-Billed	Podilymbus podicepo
Gull, Herring	Larus argentatus
Gull, Greater Black-Backed	Larus marinus
Gull, Ring-Billed	Larus delawarensis
Gull, Laughing	Larus atrieilla
Hawk, Marsh	Circus cyaneus
Hawk, Red-Tailed	Buteo jamaicensis
Hawk, Red-Shouldered	Buteo lineatus
Hawk, Rough-Legged	Buteo lagopus
Heron, Great Blue	Ardea herodias
Heron, Louisiana	Hydranassa tricolor
Heron, Little Blue	Florida caerculea
Heron, Green	Butorides virescens
Heron, Black-Crowned Night	Nycticorax nycticorax
Ibis, Glossy	Plegadis falcinellus
Kingfisher, Belter	Megaceryle alcyon
Meadowlark, Eastern	Sturnella magna
Osprey	Pandion haliaetus
Owl, Great Horned	Bubo virginianus
Sparrow, Sharp-Tailed	Ammospiza cauclacuta
Sparrow, Seaside	Ammospiza maritima
Sparrow, Song	Melospiza melodia
Starling	Sturnus vulgaris
Tern, Common	Sterna hirundo
Tern, Forster's	Sterna forsteri
Tern, Least	Sterna albifrons
Vulture, Turkey	Catharte aura
Willet	Catoptrophorus semipalmatus
Wren, Long-Billed	Telmatodytes palustris
Wren, Short-Billed	Cistothorus platensis
Yellowlegs, Lesser	Totanus flauipes
Yellowlegs, Greater	Totanus melanoleucus

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